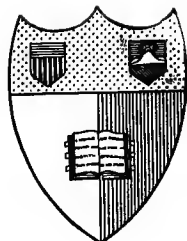


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FOR
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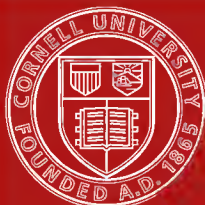
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STANDARDS FOR CITY CHURCH PLANTS

TO BE USED WITH

The Interchurch World Movement
Score Card for Rating City Churches
and Religious Education Plants

Additional copies of this book may be
secured at fifty cents each,
postpaid. *from:*

WALTER S. ATHEARN, *Director*
54 Converse Ave. Malden, Mass.

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OF NORTH AMERICA

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NOTE

The standards presented herein were prepared by N. L. ENGELHARDT and E. S. EVENDEN in collaboration with the staff and special committee of the American Religious Education Survey Department of the Interchurch World Movement of North America.

Preface

THE American Religious Education Survey Department of the Interchurch World Movement has been charged with the task of surveying the conditions of religious education in the home, in the local church and in the community. An examination of the educational work of the local church involves a critical survey of the church and school buildings. The task of measuring and evaluating educational plants required the creating of standards and measuring units which would be as nearly as possible free from individual bias and which would represent the largest range of experience. In July, 1919, this Department began the assembling of the data from which score cards and standards could be created. Hundreds of men and women have participated in the formulation of the standards which will be used in measuring the church and religious education buildings of the United States. Dr. N. L. Engelhardt and Dr. E. S. Evenden of the Department of Educational Administration, Teachers College, Columbia University, have been in active charge of this important work. They have rendered a significant service to the field of religious education. The Department has placed at their service the outstanding architects, builders, artists, musicians, educators and clergymen of the country. The large body of experience and technical knowledge assembled from many sources has been organized in harmony with approved scientific methods.

The resulting standards are not offered as final statements. They are offered, however, as the most satisfactory standards at present available as a basis for the measuring of city church and religious education plants.

The standards set forth on the following pages are designed for the measurement of the highest type of city church school buildings. In terms of these standards ratings of existing church buildings or of the plans of proposed church buildings may be

made. The divisions and subdivisions of the building standards follow exactly those of the church building score card. Judges who desire to become efficient in the use of the score card will find it necessary to become thoroughly familiar with all the standards set forth in the following pages.

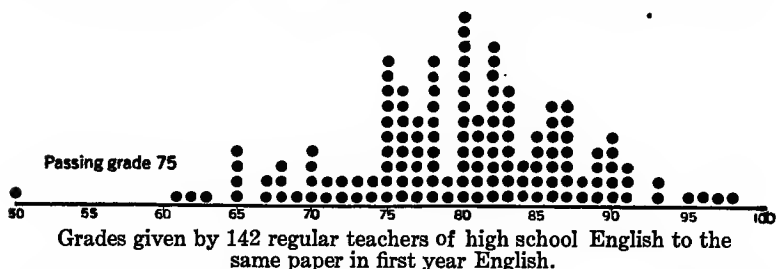
The score card and accompanying standards have been prepared especially for the surveyors who are selected to score the church and religious education buildings which are included in the survey now being conducted by this Department. They are presented to the public in the present form with the hope that they may be of service to all who are interested in improving the physical equipment of the church and the church school.

WALTER S. ATHEARN, *Director*,
American Religious Education Survey Department.

CHAPTER I

The Purpose, Nature and Use of
Objective Standards of Measurement

WHENEVER it is necessary to "take stock" in any enterprise, the method of arriving at the final evaluation is exceedingly important. Every evaluation involves an estimate or judgment and these have been proved to vary tremendously both from one time to another with the same individual and also between different individuals. This variation is relatively unimportant as long as the judgments are made within any single unit and by the same individual, but when it is desirable to make comparisons of that unit with any other, the method of arriving at the values given must be known in order that the comparisons may be made. Where judgments are made without a definite and agreed upon standard, they vary as widely as the experiences of the individuals making the judgments. This or that element in the situation being evaluated is given varying degrees of importance by the several judges as it appeals to their own personal preferences. Examples of this would be in the judgments made on a piece of music or a painting. The amount of this variation is well shown by the studies made by Starch* of the grades given by teachers to the same examination paper.



Where as great variation is found as this in a group of well-trained people because there had been no common agreement on the standards to be used, it is obvious that with untrained judges and indefinite standards the judgments will vary even more widely. This would practically vitiate the judgments.

*Starch, Educational Measurements, page 5, Macmillan Co.

In order to escape these wide variations in judgments, various methods have been devised and applied with varying degrees of success. In evaluations of physical objects it has been found easier to determine definite standards and apply these by means of a score card. The score card may be considered, in a sense, as a measuring stick, with its varying divisions. It makes judgment more accurate in somewhat the same degree as the use of a yard stick will increase the accuracy of measuring the distance across a room. .

As a method of forming comparable judgments, the score card has been extensively developed and successfully used in the fields of agriculture and animal husbandry. It has also proved an effective method of determining the efficiency of public and private school buildings. In this latter field the score card has been so successful in reducing to a negligible minimum the effect of individual differences that three judges trained in its use have been repeatedly able to score a school building independently of each other and have their scores agree to within two or three per cent. of the total possible score.

One of the big advantages of the score card is that it breaks up a large, overwhelming total situation into many smaller items which are more readily recognized and evaluated. For example, it is easier to give a judgment upon the stairways of the building when considered as a separate item than to trust to remembering them in a gross judgment of the whole plant.

A second advantage of a score card is that it makes a complete analysis of the various elements to be considered in the final judgment, and, by listing them and requiring a score on each, it insures that each of these items shall be considered in the final judgment.

A third advantage is that it gives a rating to the several items in such a way that no one item may unduly influence the score, no matter what the particular bias of the individual scorer may be.

A fourth advantage is an outgrowth of the second and third, namely that the scores when determined in this way are entirely comparable with scores, similarly obtained, of any other situation.

A fifth advantage accrues from the establishment of definite and detailed standards which accompany each of the items considered. This makes it possible for the judges to be familiar with the standards which are desirable for each item. They, therefore, are better able to determine the degree of efficiency or adequacy of the present equipment in terms of the same standard used by all other judges.

A sixth advantage of the score card is that it permits of a further elimination of individual variations by enabling three or more judges to score the same situation; thus the median or most conservative of these three judgments is utilized in securing the total score for any single situation.

A seventh advantage of the score card, which is in some respects the most important of its uses, is its value as an instrument of diagnosis. By means of the divisions of the card and the scores given, it is relatively easy to glance through the score card for any particular situation and accurately determine where the plant is adequate; where it needs assistance; what kind of assistance is needed; and, within certain limits, how much help is needed. After the score card has been used on a number of cases it will be possible readily to determine whether a certain plant is worth remodelling or whether it would be financially cheaper and more advantageous, in the light of possible community service to be rendered, to discard the present equipment and build a new plant. The time saved and the accuracy gained by the diagnostic use of the score card constitute advantages which make a score card invaluable in surveying a large number of situations.

The materials for this score card for the city church and religious education plants were assembled by the authors from

the best practises and standards which were found to have been developed. Actual situations were studied, noted architects were consulted, the available literature on the subject was reviewed, students in the larger schools of religious instruction were asked to propose standards and plans, and several committees of nationally recognized specialists were asked to check the standards set up for several of the items.

After the items were determined and the standards set, the various items were weighted as to their relative importance by over two hundred competent judges from the field of religious education. These judgments were assembled and the median judgments were determined for each of the items. In this way the allotment of points to each major item, including the literal subdivisions, of the score card is the result of over two hundred judgments on its relative importance.

In using the score card it is highly desirable to have it used by three or more judges who make their allotment of points entirely independently of each other. The final score should then be made from the total of the median or middle judgments on all items.

When church and religious school buildings are evaluated by trained scorers using this score card, it will be possible to compare the adequacy of any particular plant with that of any other; to compare the relative provisions for church and religious school buildings in one city with those of another; in one section of the country with those of another section. In other words, it will be possible to show for the entire country the adequacy or inadequacy of the church and religious education plants, and the opportunities which they do or do not afford for the most comprehensive type of religious instruction and community service.

CHAPTER II

The Score Card for a City Church and Religious Education Plant

ON THE following three pages will be found the complete score card which may be used in evaluating a church and religious education plant. It will be noted that this score card is divided into six major items: I. Site; II. Building or Buildings; III. Service Systems; IV. Church Rooms; V. Religious School Rooms; VI. Community Service Rooms. In turn each major item has been subdivided so that for the entire plant one hundred and thirty-one subdivisions are utilized for purposes of scoring.

Opposite each item on the score card appears the total possible score which may be allotted such item. In scoring a plant the scorer allots to each item the number of points from the maximum possible score which, in his opinion, the conditions warrant. The standards given in Chapter III will always form the basis for the allotment of points.

Three columns have been arranged for scoring. The blank spaces opposite the figures in Column 1 are used for the entry of scores given on the Arabic subdivisions. The blank spaces opposite the figures in Column 2 are used for the totals allotted the literal subdivisions. In the blank spaces opposite the figures in Column 3 are given the total scores on each of the six major divisions.

For further information on the use of this score card see "Manual for the Use of Interchurch World Movement Score Card for Judging Church and Religious Education Plants."

12 STANDARDS FOR A CITY CHURCH

SCORE CARD FOR A CITY CHURCH AND RELIGIOUS EDUCATION PLANT

	1	2	3
I. SITE			130
A. Location		55	
1. Accessibility	30		
2. Environment	25		
B. Nature and condition		30	
1. Drainage and soil	15		
2. Upkeep of site	15		
C. Size and form	45	45	
II. BUILDING OR BUILDINGS			150
A. Placement		20	
1. Orientation	10		
2. Position on site	10		
B. Gross structure		80	
1. Type and esthetic balance	20		
2. Material	10		
3. Height	5		
4. Roof	5		
5. Foundation	10		
6. Walls	10		
7. Entrances	5		
8. Condition	15		
C. Internal structure		50	
1. Stairways	10		
2. Foyer and corridors	10		
3. Basement	10		
4. Decorative attractiveness	20		
III. SERVICE SYSTEMS			160
A. Heating and ventilation		40	
1. Kind	10		
2. Installation	10		
3. Air supply	5		
4. Fans and motors	5		
5. Distribution	5		
6. Temperature control	5		
B. Fire protection system		40	
1. Apparatus	10		
2. Fireproofness	15		
3. Escapes	5		
4. Electrical wiring	5		
5. Fire doors	3		
6. Exit lights and signs	2		
C. Cleaning system		10	
1. Kind	2		
2. Installation	3		
3. Efficiency	5		

SCORE CARD

(Continued)

	1	2	3
D. Artificial lighting system.....		15	
1. Gas and electricity.....	2		
2. Outlets and fixtures.....	5		
3. Methods and illumination.....	8		
E. Water supply system.....		15	
1. Drinking.....	5		
2. Washing.....	5		
3. Hot and cold water.....	5		
F. Toilet system.....		25	
1. Distribution.....	5		
2. Fixtures.....	5		
3. Adequacy and arrangement.....	8		
4. Seclusion.....	2		
5. Sanitation.....	5		
G. Other service systems.....		10	
1. Clocks and signal systems.....	5		
2. Church bells and chimes.....	2		
3. Telephone connections.....	2		
4. Service lifts.....	1		
H. Service rooms.....		5	
1. Workshops.....	2		
2. Service office.....	2		
3. Fuel room.....	1		
IV. CHURCH ROOMS.....			170
A. Convenience of arrangement.....	20	20	
B. Auditorium.....		100	
1. Size and shape.....	15		
2. Seating.....	5		
3. Illumination.....	8		
4. Walls and ceiling.....	5		
5. Floor.....	5		
6. Balcony.....	8		
7. Pulpit and platform.....	5		
8. Baptismal equipment.....	5		
9. Communion equipment.....	2		
10. Organ and piano.....	15		
11. Choir gallery.....	10		
12. Choir rooms.....	5		
13. Acoustics.....	5		
14. Visualization equipment.....	5		
15. Cloak or check room.....	2		
C. Chapel or small assembly.....	15	15	
D. Parlor and church board room.....	5	5	
E. Church office.....	10	10	
F. Pastor's study.....	15	15	
G. Church vault.....	5	5	

SCORE CARD

(Concluded)

	1	2	3
V. RELIGIOUS SCHOOL ROOMS.....			200
A. Location and connection.....	15	15	
B. Assembly room.....		60	
1. Size and shape.....	10		
2. Seating.....	8		
3. Illumination.....	10		
4. Walls, ceiling and floor.....	10		
5. Stage.....	10		
6. Musical equipment.....	5		
7. Visualization equipment.....	5		
8. Auxiliaries.....	2		
C. Class rooms.....		90	
1. Adequacy of number.....	30		
2. Size and shape.....	15		
3. Seats and desks.....	10		
4. Illumination.....	10		
5. Walls and ceilings.....	5		
6. Floors.....	5		
7. Blackboards and bulletins.....	5		
8. Doors and closets.....	5		
9. Instructional equipment.....	5		
D. Cloak rooms and wardrobes.....	15	15	
E. Superintendent's office.....	10	10	
F. Supply rooms.....	10	10	
VI. COMMUNITY SERVICE ROOMS.....			190
A. Rooms for general use.....		60	
1. Recreation and dining.....	30		
2. Kitchen.....	15		
3. Library and reading room.....	15		
B. Rooms for social service.....		70	
1. Women and mothers' room.....	15		
2. Girls' club rooms.....	10		
3. Men's club room.....	15		
4. Boys' club rooms.....	10		
5. Nurses' and rest room.....	8		
6. Day nursery room.....	5		
7. Civic center.....	5		
8. Social workers' office.....	2		
C. Recreation and athletic rooms.....		60	
1. Gymnasium.....	20		
2. Locker rooms.....	10		
3. Showers.....	10		
4. Swimming pool.....	5		
5. Hand-ball court.....	5		
6. Game and amusement rooms.....	5		
7. Bowling alley.....	5		
Total possible score.....	1,000	1,000	1,000

CHAPTER III

Interchurch World Movement Standards for a
City Church and Religious Education Plant

THESE standards are designed to accompany the score card for a city church and religious education plant. The standards, in order to conform to the outline presented in the score card, have been divided into six major sections as follows: (1) Standards on Site; (2) Standards on Building Placement and Construction; (3) Standards involving all Service Systems; (4) Standards for Church Rooms; (5) Standards for Religious School Rooms, and (6) Standards for Community Service Rooms.

I. STANDARDS INVOLVED IN THE SITE OF A CHURCH-
SCHOOL PLANTA. *Location*

1. Accessibility

- a. Near enough to the business section of the city to profit by the convergence of roads and car lines, if a "downtown" church.
- b. In the direction of the city's growth rather than behind it.
- c. Located centrally with respect to its entire constituency.

2. Environment

- a. Adjoining attractive, clean and well-kept property (trees, lawns, etc.).
- b. Sanitary and healthful—free from malodors.
- c. Remote from fire dangers—not adjacent to large wooden or non-fireproof buildings, gas tanks, or other fire spreading structures.
- d. Quiet—not adjacent to any factory, planing mill or plant employing machinery, or shops such as tinsmiths, auto repair shops, passing street cars or railroad trains. Streets should not be brick or cobblestone.
- e. Not near over-towering buildings, but placed in proper architectural setting on a strategic location.

B. *Nature of Site and its Condition*

1. Drainage and nature of soil

- a. Natural slope preferred, sloping away from building at a minimum slope of 1 inch in 3 feet.
- b. Entire site should be thoroughly tiled with special provision for the basement. Protected from surface water from higher contiguous ground. Nature of soil should determine the depth of the tile.

- c. Sandy loam and fertile enough for good lawns and landscape gardening.
- d. Playground—quick drying (rapidly drained) with turf or artificial surface of crushed stone or gravel. Natural soil preferred to artificial.

2. Upkeep of Site

- a. Entire site should show evidence of proper maintenance. Lawns should be well kept; shrubbery well trimmed; walks clean and in good repair; fences or walls in good state of preservation. Grounds should be free from unsightly ash piles, waste paper, rubbish of any kind and weeds.

C. *Size and Form of Site*

- a. Should be large enough and of a shape to allow for the proper placing of building or buildings and for future additions.
- b. Should be large enough to provide
 - (1) In front for ample lawns and shrubbery for outdoor fêtes, pageants and other festivals;
 - (2) In rear for playgrounds, tennis courts, ball ground, and other athletic facilities to be provided.
- c. A plot of from 3 to 10 acres, depending upon the size of the community to be served, is necessary for these activities.
- d. Where city congestion is such as to prevent acquisition of standard site, roof garden should be planned for festivals, song services, play and other outdoor activities. Its construction should care for the following elements:
 - (1) Adequate roof covering, rail protection, shields against wind, rain and snow;
 - (2) Storage facilities and the extension of all service systems to the roof garden;
 - (3) The special equipment consisting of tables, chairs, portable stage and piano.
- e. Where playground and athletic field are separated from the church site they should not be so distant that the school and gymnasium equipment cannot be used.

II. BUILDING OR BUILDINGS

A. *Placement*

1. Orientation

- a. Buildings should be so placed upon the lot that the light exposure will be in order of preference, southeast, east, southwest, or west. Buildings should not have full northern or southern exposure.
- b. If the building is a one-story structure, poor orientation may be overcome by means of overhead lighting.
- c. The diagonal placement of the building upon its site may be made an esthetic advantage by means of the proper placement of trees and shrubbery.

2. Position on Site

The buildings should be so placed

- a. As to secure a maximum of esthetic effect.
- b. As to provide for the greatest possible utilization of grounds.
- c. As to permit either future additions to present buildings or additional buildings.

B. *Gross Structure of Building or Buildings**

1. Type of Esthetic Balance

- a. Architectural—practically all of the types of church building architectures will lend themselves to standardized conditions. The selection of the type desired will depend largely upon the architecture of other large public buildings in the immediate vicinity.
- b. A church school plant should in its architecture clearly indicate its purpose.
- c. Dignity and beauty are essential characteristics of the gross structure.
- d. Building should be architecturally consistent, that is, it should conform throughout to the line forms and movements established by the architectural type after which it is built. Any variations in these should be in harmony with the symmetry and general effects of the building.
- e. Expensive and costly ornamentation which does not add to utility should be avoided unless absolutely necessary in order to make the building conform to its type.
- f. The building should be planned to harmonize with the surrounding structures. "Harmonize" should be understood to mean not duplication of material or style, but rather an addition to existing buildings of a style not in architectural discord.

2. Material

Churches of granite, stone or marble produce effects of enduringness, massiveness and solidity. These materials are more affected by fire than is vitrified brick or reinforced concrete. Fireproof materials should be used throughout in all structures of more than one story.

3. Height

- a. The church structure should not be more than two stories above the basement. The school structure should conform to this standard except in very congested cities where it may be three stories when strictly fireproof.
- b. The basement should not be used for social or educational purposes when more than three feet below the ground level.

4. Roof

- a. Style and shape of roof will be determined by the type of architecture employed for the church building and the purpose for which the roof is used.

*For construction classification of the American Institute of Architects, see page 53.

- b. The roof should be laid with slate, tile or asbestos shingle.
- c. The roof should be provided with eaves gutters, drain pipes and guard rails for preventing snow slides.
- 5. Foundation
 - a. The foundation should go deep enough to secure a firm support for the walls, arches or tower in order to prevent settling.
 - b. Foundations should be preferably of concrete, reinforced where necessary, or masonry with a wide footing.
 - c. Foundations enclosing basement should be made waterproof and dampproof.
- 6. Walls
 - a. All bearing walls should be of steel girder and column construction, hard brick laid in cement mortar, reinforced concrete or masonry. Steel girder and column construction allows freedom in placement of partitions and is more economical to erect. All steel should be thoroughly fireproofed.
 - b. Non-bearing walls should be of hollow tile.
 - c. Outer walls, if of brick or masonry, should be double or backed with hollow tile with dead air-space.
 - d. Outer walls should be furred.
- 7. Entrances
 - a. Main and secondary entrances should be provided both for the church and the school building. The main entrance should not be less than 10 feet to 12 feet wide and should open directly into the main foyer.
 - b. Secondary entrances 6 feet to 10 feet wide for double doors, 3 feet or 4 feet wide for single doors, should be placed near the stairways and at the intersections of the main and secondary corridors.
 - c. There should be at least one entrance leading directly from the playgrounds to the gymnasium.
 - d. There should be separate entrances to the heating room, to the library, to the social rooms or other parts of the building used for club room purposes. It is desirable to have these parts of the building so located that they can be used without opening the entire building. All incased fireproof stairways or other fire escapes should have separate entrances.
 - e. It is desirable for the rooms used for day nurseries, beginners or primary classes, to be on the first floor and to have separate entrances.
 - f. All entrances should be free from outside obstructions.
 - g. Steps
 - (1) As few as possible and non-exposed. Inclines where possible.
 - (2) Stone or concrete.
 - (3) 5-inch riser and 14-inch non-slipping tread.
 - h. Vestibules
 - (1) 10 feet to 12 feet wide.
 - (2) Double swing doors and waterproof floor.

i. Doors

Doors should open outward and be provided with panic bolts, checks and foot stops.

j. Welcome sign and public bulletin

- (1) Should be conspicuously located near main entrances.
- (2) Easily legible from street during both day and evening.

8. Condition

- a. The building should be kept in a condition of constant repair. Woodwork and metal trimmings should be protected against weathering by painting.
- b. Any part of the building directly exposed to dust or dirt should be frequently cleaned. Masonry which cracks from freezing should be immediately repaired. Masonry joints exposed to the weather should be repointed in order that the joints between the stone may not become seepage points.

C. Internal Structure of Building or Buildings

1. Stairways

a. Construction

- (1) Should be separated from corridors by fireproof doors in basement and on other floors.
- (2) Should be constructed entirely of fireproof material.
- (3) Dimensions should be based on formula that "width of tread plus twice the riser equals twenty-four inches." Width will vary with the width of the corridors and the width of the doors. They should, however, not be less than 4 feet. If more than 5 feet, there should be a dividing rail.
- (4) Any landing should have a width equal to the length of the longest tread in the stairs leading to it. Winders should be avoided.
- (5) All stairways should be provided with hand rails, preferably of two heights, for children and adults.

b. There should be enough stairways to empty the balcony or second floor in two minutes' time.

c. Lighting provisions for natural as well as artificial light should be made. Switches for electric lights should be near the exits. There should also be gas light on stairways and at exits.

d. Sanitation—Where angles and corners would otherwise occur in stairways construction, the plans should provide for concave surfaces (coves) thus preventing the accumulation of dust, dirt, and germ-carrying filth in places inaccessible to brooms and brushes.

e. No storage room should be permitted under stairways, unless strictly fireproof.

2. Corridors and foyer

a. Corridors

- (1) Location. Determined by the position of the auditorium and special rooms. Should provide ready access to the stairways and permit rapid circulation to every part of the building.

(2) Construction

- (a) Material, with exception of that for the floor surface, should be fireproof. The floor surface should be durable and noiseless. Cement overlaid with patent process or battleship linoleum is most desirable. Hard maple or hard pine is the best wood.
 - (b) Should be wide enough to prevent congestion; with the main corridor, wide enough for decoration.
 - (c) All classroom and special room doors should open into corridors.
 - (d) Lighting should be natural and adequate.
 - (e) Sanitary coves free from dust catchers.
 - (f) Should be free from obstructions which prevent easy egress.
- (3) Provision should be made for using the influence of beautiful surroundings, pictures, busts, friezes, and the like.

b. Foyer

- (1) Should be located directly off main entrance and should have principal corridors and stairways leading from it.
- (2) Should be large enough to permit distribution of the people to different parts of the building without confusion.
- (3) Should be large enough to permit "exchange of greetings" on the way out from meetings.
- (4) Should be equipped with umbrella racks and door mats.

3. Basement

Depth below grade 3 feet, except for rooms not used for educational and social purposes, such as boiler rooms, ventilating plant, and coal pits, which may be lower and at a depth which will permit the direct dumping of coal from driveways. Ducts for the distribution of air may be enclosed in moisture proof passages underneath the floor. This will keep the height of the rooms on the ground floor down to 12 feet, except where the gymnasium is on the basement floor. If 25 per cent. of the ceiling is covered with ducts, add their height to the height of the rooms.

4. Decorative attractiveness

- a. Care should be taken to have the interior decorations of the church as productive of a worshipful attitude as is possible. Some of the characteristics which produce this effect should also be given to the church school rooms. Woodwork, dado, walls, ceiling, windows, furniture, shades, finish, and fixtures should be in color harmony.
- b. Care should be taken to secure restful harmony of proportions, and particularly of colors. Balance in color relation produces a restful effect and leaves the mind at ease for contemplation. Perfect color balance is found in the middle tone value of pure neutral, which is a gray made by mixing black and white in equal quantities. This balanced tone, or tones closely related to it, should be used as often as possible. Color interest is secured by using very neutral qualities of any hue,

such as blue, green, red, purple, yellow, etc. To produce a very neutral hue use the middle value of gray and add a small quantity of color pigment. Brilliant hues in any value, light, middle or dark are invariably irritating and distracting. The direct facing of light or sitting in crosslights should be made impossible.

- c. The interior structure of church buildings should, as far as possible, symbolize many of the essential elements of religious life, such as simplicity, genuineness, cleanliness, permanence, modesty, stability, etc. Over-ornateness should be avoided.

III. SERVICE SYSTEMS

A. Heating and Ventilation

Systems of heating and ventilation are here classified and designated by a compound word for each system. The word preceding the hyphen indicates the method of *Heating* and the word following the hyphen indicates the system of air supply, *Ventilation*.

Where the word "direct" is applied to a heating system it means that the heat is imparted directly to the room by means of radiating surfaces or heat sources located within the room heated. Steam and hot water radiators and electric heaters are appliances classified under this heading.

Where the word "indirect" is used it means that heat is imparted indirectly to the room by air initially warmed by radiating surfaces or heat sources located outside of the room heated and the warm air is conveyed therefrom to the room through suitable air ducts or flues. Hot air furnaces and standard steam and hot water indirect radiators are appliances classified under this heading.

Where the word "gravity" is applied to a ventilation system it means that the required air movement is maintained by the force of gravity only, either with or without acceleration by means of an added source of heat. The capacity of a "gravity" system should be determined upon the basis of a difference of indoor and outdoor temperature of forty (40) degrees Fahrenheit or less.

Where the word "mechanical" is used it means that the required air movement is maintained by the use of blowers, fans or similar mechanically operated appliances.

1. Kind

- a. "Furnace-Gravity" system includes hot air furnaces. These are located in the basement and below the room or rooms to be heated. They take the air from out-of-doors and deliver warm air to the rooms without the use of mechanical devices. Ducts or flues of proper size are provided. The air in sufficient volume to heat and ventilate the rooms is warmed to a temperature adequate to maintain the requirements set up in these standards. In addition, there is provided a corresponding gravity exhaust system, which withdraws vitiated air from the rooms and discharges it out-of-doors. The discharge may be affected with or without acceleration by means of an added source of heat.
- b. "Direct-Natural" system means an equipment including direct radiators under the windows for heating the room and properly designed deflecting ventilators for the windows. These ventilators will allow the natural admission of the air from out-of-doors. A system of exhaust ventilation for the removal of vitiated air in the required volume, through specially located outlets in the room, should be provided. Desirability is based on the following rules:
 - (1) This system should not be used in large audience rooms.
 - (2) It should be used only in connection with a steam atmospheric vapor system of heating with graduating control valves on the radiators.

- (3) The radiators should extend the full width of all windows. All windows should be used for the admission of air to the room. Radiators should contain not less than twice the radiating surface otherwise necessary to maintain the required room temperature.
 - (4) Window deflecting ventilators, not less than twelve (12) inches high should be placed on the sills and extend the full width of all windows. They should be of approved construction, insuring effective deflection and diffusion of the air without objectionable drafts.
 - (5) Vitiated air should be taken through one or more openings located near the floor of the room and preferably in the wall opposite the windows. Each opening should connect with an independent exhaust flue extending through the roof. The combined areas of such flues should be not less than one (1) square foot for each five occupants of the room. Each flue should be provided with a shut-off damper. For a mechanical exhaust, or for a gravity accelerated exhaust system, one such opening and flue for each room may be provided. This single opening should be located as above required.
- c. "Direct-Gravity" system means an equipment, including:
- (1) Direct radiators located within the room to be heated.
 - (2) Indirect radiators, in suitable casings, located below the rooms to be ventilated. The air is taken from out-of-doors over the indirect radiators and delivered to the rooms in sufficient volume and at approximately the required room temperature, without the direct use of mechanical means. Ducts and flues of proper size are used for the delivery of air. Approved mechanical means are provided for auxiliary use when necessary. A corresponding gravity exhaust system, which withdraws the vitiated air from the rooms and discharges it out-of-doors, is installed. This exhaust system may or may not be installed with provision for acceleration by means of an added source of heat.
- d. "Direct-Mechanical" system includes the following:
- (1) The "split system," providing both direct radiators located within the rooms to be heated, and a forced air supply for rooms requiring ventilation. The forced air supply system should consist of a mechanically operated fan or blower, which takes the air from out-of-doors and draws or forces it through suitably enclosed air-heaters. At these heaters it should be warmed to approximately room temperature and thence delivered to the rooms through properly proportioned ducts or flues.
 - (2) The "unit system." Such a unit system includes in each room one or more ventilating units, which are located under the windows and which contain electrically operated twin multiblade fans, drawing the air directly from out-of-doors and delivering it to the room in the required volume. The ventilating unit also contains extended surface steam radiators for heating the air to the required temperature.

In connection with either of the above systems a corresponding mechanical or gravity exhaust system is used. This exhaust system withdraws the vitiated air directly from the rooms and discharges it out-of-doors. The discharge may be with or without acceleration by means of an added source of heat.

- e. The "Indirect-Mechanical" system includes no direct radiators within the schoolrooms, but should provide for both the heating and ventilation of schoolrooms to the required standard by means of a forced system of air supply. A mechanically operated fan or blower is employed which takes the air from out-of-doors and draws or forces it through suitable enclosed steam or hot water indirect radiators or through hot air furnaces. When thus warmed to a sufficient temperature, the air is delivered to the classrooms through properly proportioned ducts or flues. A corresponding mechanical or gravity exhaust system for rooms requiring exhaust ventilation is used. This system provides for the withdrawal of the vitiated air from the rooms and its discharge out-of-doors. This system may be installed with or without acceleration by means of an added source of heat. The indirect mechanical system requires, in addition, direct radiators sufficient to heat all rooms where water is provided and also direct radiators at all entrances.

- f. "Direct-Indirect" Ventilation

The so-called "direct-indirect" system of heating and ventilation is not acceptable. By "direct-indirect" is meant the introduction of air at the base, or upon any part, of a "direct" radiator without the use of a fan as provided in the "unit system."

2. Installation

- a. Hot air furnaces should be of approved design, having fire pot and radiator entirely surrounded by insulated sheet metal casing or masonry enclosure. This enclosure should be so arranged that no perceptible resistance is encountered by the air in passing to the warm air leaders. Should be provided with approved water evaporating pan located within the casing, preferably near the top.

Should be computed for size on the basis of:

- (1) Total heat necessary for heating the building and warming the air for ventilation to standard temperature.
- (2) The heating value of fuel.
- (3) The rate of combustion.
- (4) The combined efficiency of furnace and grate. The heating surfaces and grate area of the furnace should be such that its rated and required capacity may be obtained without forcing, under any conditions of service.

- b. Steam and Hot-water Boilers

Should be constructed and equipped in accordance with the boiler rules of the American Society of Mechanical Engineers. Should be installed with sufficient space on all sides to allow of proper firing, adequate cleaning and ready access to all parts for necessary repairs.

Should be computed for size on the basis of:

- (1) The total connected heat-radiating surface, including direct and indirect radiation, water-heating coils, mains and risers, each reduced to its equivalent of direct radiating surface.
- (2) The available fuel charge for any boiler should be sufficient to maintain the boiler rating for not less than eight (8) hours without replenishing when connected to not more than four thousand (4,000) square feet of equivalent direct steam radiating surface, or to not more than six thousand (6,000) square feet of equivalent direct water radiation. For larger connected loads the fuel charge should be sufficient to maintain the boiler rating for not less than six (6) hours without replenishing.

c. Direct Radiators

Should be constructed of cast iron, having smooth surfaces. Coils should be constructed of wrought iron pipe and cast iron coil fittings.

Should be located under windows, wherever possible, except as provided below. When so placed, radiators should not extend above the window stool. They should not be located under the blackboards of classrooms. In stair halls which are used as fire exits, direct radiators should be located at a distance of more than six (6) feet from the floor, the stair treads, or the stair landings.

Should be located not less than two (2) feet above the working water level in the boiler, if used on a steam gravity-return system.

When used without a system of indirectly warmed air supply, direct radiators should have been computed for size on the basis of the total heat loss, under the required temperature conditions, through all exposed glass, wall, roof and floor surfaces, including one room air change per hour, or equivalent as allowance for leakage.

When used in conjunction with a system of indirectly warmed air supply, direct radiators should be computed on the same basis as required above but excluding allowance for air leakage. Such leakage should be provided for in warmed air admitted for ventilation. Where a unit system is used, direct radiation, in addition to the ventilating units, should be installed sufficient to heat the rooms as required above, unless the units are of ample size and so arranged to allow direct heating of the room without the use of fans.

When placed in enclosures, direct radiators should be increased in size over the above requirements by not less than thirty (30) per cent. Six (6) square inches of register area at top of radiators and four (4) square inches of register area at bottom of radiator, per square foot of radiation should be provided. As a substitute, a grille over the entire front of the radiator, extending above the top of the radiator, may be used. Enclosures should be lined with galvanized iron and asbestos sheets. Easy access to valves should be provided.

d. Indirect Radiators

Should be constructed preferably of cast iron having extended surface, or may be made of wrought iron or steel pipe with suitable cast iron headers.

Should be encased in sheet metal, or other fireproof enclosures, to confine the flow of the air close to, and in contact with the radiator sections.

Should be computed for size on the basis of:

- (1) Required air volume.
- (2) Required temperature rise.
- (3) Free air space or efficiency of the radiator.
- (4) Air velocity.

The velocity through the radiator should not exceed the necessary air velocity in the connecting warm air flues, when used in a gravity air supply system. The velocity through the radiator should not exceed twelve hundred (1,200) feet per minute when used as a central air tempering heater in a mechanical air supply system.

e. Accelerating Heaters

May be steam radiators, either hung in separate exhaust flues not more than twelve (12) inches above the highest opening in the flue, or placed in fireproof enclosures in roof space at the junction of several exhaust flues. When used in connection with a furnace gravity system, accelerating heaters may be stack heaters located at the base of the central exhaust flues. The use of hot water radiators as accelerating heaters is not desirable.

Should be computed for size on the basis of not less than two (2) square feet of steam-heated surface for each one hundred (100) cubic feet of air per minute to be exhausted through the flues.

f. Piping

Should be of ample capacity and properly arranged for the system of distribution used. Should have proper main control valves located at or near the boiler. Every stack of indirect radiation should be valved to allow of separate control. For large heating installations, the piping for direct radiation and indirect radiation should be arranged on separate systems. Each system should be properly valved to allow of separate operation. Piping installed under floors, in unexcavated spaces, or in earth, should be carefully protected against corrosion by being suitably painted and by being enclosed in approved tile or masonry conduits or trenches. Piping laid in cinder or concrete floor fill or construction should be protected by suitable heavy steel metal arches, or equivalent device. Ample space should be allowed for expansion and contraction of all concealed piping.

g. Pipe and Boiler Coverings

Should be made of approved non-conducting heat insulating materials in the form of sectional coverings for pipes carrying steam or hot water and plastic felting for pipe fittings and other hot surfaces.

Should be used on all main distribution piping and branches and on all piping inaccessibly concealed in the building construction or installed in locations liable to exposure to freezing temperature.

Should be applied to steam and hot water boilers and to furnaces when such heating appliances are not otherwise enclosed in masonry or specially insulated casings. Coverings should also be applied to all steam and hot water piping in boiler rooms located under occupied rooms.

h. Flues and Ducts

All ducts and flues used for conveying air for heating and ventilation should be constructed throughout of fireproof materials, having smooth interior surfaces and rendered tight against air leakage.

i. Warm Air Riser Flues

Should be individual flues for respective rooms served. The use of a common flue serving more than one room is not acceptable.

Should be computed for area when used in a gravity system of air supply, on the basis of maximum allowable air velocity, as follows:

(1) For rooms on the first floor (above the heaters) 250 feet per minute.

(2) For rooms on the second floor (above the heaters) 300 feet per minute.

Should be computed for area when used in a mechanical system of air supply, on the basis of maximum allowable velocity of four hundred (400) feet per minute.

j. Exhaust Air Riser Flues

Should be individual flues for rooms served with the exception that a common flue serving more than one room, other than rooms for assembly purposes, may be used, provided every room exhaust connection thereto is supplied with an approved automatic fire damper.

Should be computed for area, when used in a gravity system of exhaust ventilation, on the basis of maximum allowable air velocity, as follows:

For flues 15 feet high or less, 200 feet per minute.

For flues 15 to 30 feet high, 250 feet per minute.

For flues 30 to 40 feet high, 300 feet per minute.

For flues 40 to 50 feet high, 350 feet per minute.

Should be computed for area, when used in a mechanical system of exhaust ventilation, on the basis of maximum allowable velocity of:

(1) Four hundred (400) feet per minute for individual flues.

(2) Six hundred (600) feet per minute of over four (4) square feet area common to two or more rooms.

Should be carried through the roof, either as individual flues, or after being joined to a common flue at or near the roof level. Exhaust air riser flues may be connected by a system

of lateral ducts to exhaust fans, centralized roof ventilator, central accelerating chambers, belfries, steeples, or equivalent devices. In no case should exhaust flues discharge into open attic spaces.

Where carried through the roof, exhaust air riser flues should extend to, or above, the level of any adjacent copings or other raised portions of the roof. In all cases such extensions should be not less than three (3) feet above the roof.

Exhaust flues should be provided at top with approved caps, ventilator heads, or equivalent devices, to exclude the weather. Such devices should have on at least two opposite sides a free area of opening equal to not less than the area of the flue.

k. Lateral Ducts

Should be computed for area with reasonable reference to the velocity of the air carried in the riser flues to which they connect. The maximum allowable velocity in any lateral duct should be as follows:

- (1) For a gravity system four hundred (400) feet per minute.
- (2) For mechanical system, using individual lateral ducts, eight hundred (800) feet per minute.
- (3) For a mechanical system using lateral trunk ducts, twelve hundred (1,200) feet per minute.

l. Smoke Flue

- (1) A separate smoke flue should be provided for the heating furnace or boiler. It should be constructed of fire-resisting materials throughout, having smooth interior surface. The flue, if unlined, should be constructed with brick walls not less than twelve (12) inches thick. If lined with tile the brick walls should be not less than eight (8) inches thick. The smoke flue may consist of a steel stack enclosed by brick walls not less than twelve (12) inches thick. The smoke flue should extend not less than two (2) feet above the highest point of the roof or an equal distance above any roof copings.
- (2) The smoke flue should be computed for minimum area in square feet for round or square flue based upon the area of the boiler or furnace grate in square feet divided by the square root of the total flue height in feet above the grate level, when large size anthracite and bituminous lump coal, oil or gas is used as fuel. The area should be increased by twenty-five (25) per cent. when small size anthracite or run-of-mine bituminous coal is used. For rectangular flue the relation of the sides should be not less than in the ratio of one (1) to two (2).

m. Room Openings for Ventilation

Fresh air inlets, should be located:

- (1) On an interior wall with bottom of opening approximately eight (8) feet above the floor wherever possible; or
- (2) In or near the ceiling where installation conditions necessitate such location.

Exhaust air outlets should be located on an interior wall and preferably in the same wall with the fresh air inlet. Such outlets should be at or near the floor in all rooms provided directly with gravity or mechanical air supply. In rooms not provided with gravity or mechanical air supply the exhaust air room outlets should be located in or near the ceiling and preferably at point most remote from the window.

- n. For toilet, locker, shower or coat rooms having only an indirect means for heating, the warm air inlets may be located near the floor, provided the vitiated air is withdrawn from such rooms through outlets located in or near the ceiling.
- o. For a moving-picture booth the air exhaust outlet should be located in or near the ceiling and should connect to a special fire-proof duct or flue carried to a proper place of discharge out-of-doors. The clear area of this duct or flue should be based on not less than one and three-fifths ($1\frac{3}{5}$) square inches for each cubic foot of air to be exhausted. In addition the flue should be provided with an adjustable damper made operative from the booth and equipped with an appliance containing a fusible link, or equivalent device to insure the releasing and wide opening of the damper in case of fire.

p. Registers and Grilles

Should be approved cast iron, cut steel, or woven wire in wrought iron frames. They should have free air spaces in the face equal to not less than seventy (70) per cent. of the gross area of openings in which they are placed.

Should be furnished for all air supply room openings. They may be omitted for air exhaust room openings, provided suitable shut-off dampers are installed in the connecting flues or ducts. When used for openings connecting directly with vertical flues, they should have a height equal to not less than the depth of the flue, and preferably twenty-five (25) per cent. greater. Registers and grilles should be computed for net area on the basis of

- (1) A maximum allowable velocity of three hundred (300) feet per minute for air supply registers when located fifteen (15) feet or less above the floor.
- (2) A maximum allowable velocity of four hundred (400) feet per minute for air exhaust registers and for air supply registers when located more than fifteen (15) feet above the floor. The use of floor registers or grilles is not desirable.

q. Dampers

Should be provided with approved operating, adjusting or clamping devices as required for the service intended. When dampers are located in inaccessible positions such devices should be extended to accessible points.

Should have approved means of indicating their open or closed position. When placed in locations remote from the room openings served, they should be plainly marked for identification.

Shut-off dampers, or equivalent devices should be provided

at or near all points where fresh air is admitted to or vitiated air discharged from the building. They should be so arranged that such air passages may be closed when not in use. Such dampers should be capable of being set to regulate the air velocity.

Volume dampers should be provided in all air supply and air exhaust ducts or flues so arranged as to allow of an equitable adjustment and distribution of the air through the room openings.

Mixing dampers, when not automatically operated should be provided with suitable chains, pulleys, counterweights, etc., arranged for hand operation from the rooms they serve.

Automatic fire dampers should be provided in all ducts passing through a fire wall, and in all room-opening connections into a vertical flue which serves more than one room. Such dampers should be controlled by a fusible link, or equivalent device, to insure the releasing and closing of the fire damper in case of fire in such ducts or flues.

r. Deflectors and Diffusers

Should be provided for air supply room inlets whenever the location of the air inlet is such as would otherwise produce objectionable drafts or inefficient air distribution. Such deflectors and diffusers should be of approved construction and adjustable. They may be placed behind or at the opening of the register or grille or may replace such register or grille.

s. Recirculation of Air

Return ducts, providing for recirculating air should be permitted only as a means of pre-heating. Such ducts should not be used when the building is occupied, unless the circulated air is first passed through an approved air washer. When this is done, provision should be made for the introduction of not less than twenty-five (25) per cent. of outdoor air to be mixed with the washed air.

3. Air Supply and Exhaust

- a. The ventilation system should be of ample capacity and should be so installed as to supply to every room occupant during the entire period of occupancy the following minimum amounts of clean, pure, warmed outdoor air:

- (1) Thirty (30) cubic feet per minute in all rooms used for regular or special class study or recitation.

- (2) Fifteen (15) cubic feet per minute in all rooms used exclusively for assembly purposes.

The number of occupants for each room should be assumed to mean the seating capacity on the basis for each individual of not more than eighteen (18) square feet of floor area for class rooms and seven (7) square feet of floor area for auditoriums, when such rooms are used exclusively for assembly purposes.

- b. When number of occupants cannot be determined in this manner, the following rules should govern: Eight (8) air changes per hour may be substituted in lieu of thirty (30)

cubic feet per minute per occupant for rooms used for class purposes. Two and one-half ($2\frac{1}{2}$) cubic feet of air per minute per square foot of floor area for assembly rooms. A minimum of four (4) air changes per hour for all other rooms requiring ventilation.

- c. Every room having air supply ventilation should be provided also with exhaust ventilation. The volume of air exhausted should be at least equal to the volume of air supplied in each case. In toilet rooms, the air exhausted should exceed the air supplied, so that no pressure may be produced in these rooms.
- d. Every coat room adjoining a school room should be provided with exhaust ventilation. School room air may be wholly or partly exhausted through the adjoining coat room.
- e. Every sanitary and toilet room having more than one water closet or urinal fixture should be provided with air exhaust ventilation equal in volume to not less than eight (8) air changes per hour. The ducts or flues for such ventilation should be independent of, and separated from, any other part of the ventilating system. The movement of the air in such ducts or flues should be positively maintained, either by means of accelerating heaters in exhaust flues extending through the roof or by an exhaust fan or other equivalent device. Toilet rooms may be ventilated through utility chambers provided behind the water closets or urinal stalls. In such installations each water closet stall should be vented and provided with a grille of not less than thirty-six (36) square inches area located above (12) inches from the floor.
- f. A system of air supply and exhaust ventilation should be provided for gymnasiums, natatoriums, shower and locker rooms. It is not necessary where the area of movable windows communicating directly with outside air is at least equal to one-sixth of the floor area of the room. In all other cases air supply and exhaust ventilation should be provided sufficient to maintain not less than six (6) air changes per hour in each such room.
- g. Where moving-picture machines are installed the enclosures or booths for such machines should be constructed of fireproof materials and should be provided with approved independent means of air exhaust ventilation having sufficient capacity to remove at all times not less than sixty (60) cubic feet of air per minute for each machine.
- h. Fresh Air Intakes

The fresh air supply for ventilation should be taken from an uncontaminated source, preferably from above the roof, or at a point at least fifteen (15) feet above the grade level. The air supplied should be free from dust or other impurities. When taken from above the roof inlets should not be located within twenty-five (25) feet of toilet vents or chimney. Openings should be provided on side away from such toilet vents or chimney.

Should have openings protected with suitable wire screen to keep out birds, vermin and debris. Approved louvers or doors should be provided to keep out the weather when the ventilation system is not in use.

Should be computed for free area of opening based on

- (1) A maximum allowable air velocity of four hundred (400) feet per minute for a gravity system.
- (2) A maximum allowable air velocity of one thousand (1,000) feet per minute for a mechanical system.

Fresh air chambers should be clean at all times and should not be used for storage purposes.

i. Air Filters

- (1) When used for removing dust or other solid impurities from the air supplied for ventilation, air filters may be cloth equipment in the form of screens or bags and so arranged as to allow easy cleaning and renewal.
- (2) When cloth is used as a filtering material the net filtering area should be computed on the basis of
 - (a) A maximum allowable velocity of twenty (20) feet per minute for a gravity system.
 - (b) A maximum allowable velocity of forty (40) feet per minute for a mechanical system.

j. Air Washers and Humidifiers

- (1) Air washers are preferred to air filters. Air washers should be equipped with an automatic means for maintaining a relative humidity within rooms between the limits of forty and sixty per cent.
- (2) Air washers should have cross-sectional areas based on a maximum allowable velocity of two hundred and fifty (250) feet per minute for a gravity system and five hundred (500) feet per minute for a mechanical system.

4. Fans and Motors

Fans should be selected for type and capacity on the basis of the relations obtaining between the resistance to be overcome, the volume of air to be delivered and the speed of operation. They should be so designed, constructed, and mounted in connection with electric motors or other approved motive power, that they will operate quietly and without vibration, with a velocity of wheel at the periphery not exceeding thirty-six hundred (3,600) feet per minute and a velocity of air through the outlet not exceeding two thousand (2,000) feet per minute for housed fans.

5. Distribution

- a. The heating system should be of ample capacity and so installed as to insure uniform temperature being maintained in occupied rooms when the outdoor temperature is zero degrees Fahrenheit, with a variation not exceeding three (3) degrees Fahrenheit as measured on a plane three (3) feet above the floor as follows:

A maximum of seventy (70) degrees Fahrenheit and a minimum of sixty-seven (67) degrees Fahrenheit in all rooms used for class or assembly purposes. A maximum of seventy (70) degrees Fahrenheit and a minimum of sixty-five (65) degrees Fahrenheit in all cloak, sanitary and toilet rooms, corridors, passages and stair halls.

A maximum of eighty (80) degrees Fahrenheit and a minimum of seventy-five (75) degrees Fahrenheit in all shower rooms and natatoriums.

A maximum of sixty-five (65) degrees Fahrenheit and a minimum of sixty (60) degrees Fahrenheit in the gymnasium and game rooms.

All rooms or spaces used for any purpose should be heated. The capacity of the plant should be such that the maximum temperature requirements as above stated may be maintained throughout the building at all times of occupancy.

All rooms not above listed in which the occupants remain at rest should be classed under the sixty-seven (67) degree minimum. Rooms intermittently used for other than social, class or assembly purposes should be classed under the sixty-five (65) degree minimum. Rooms used for hard exercise or play should be classed under the sixty (60) degree minimum.

- b. Special Provisions. In audience rooms the air may be introduced through the ceiling and exhausted at the floor line by means of "mushroom" ventilators located under the seats. Such a system should be capable also of reversal of the air currents from the "downward" to the "upward" system of air circulation for use in summer.

6. Temperature Control

Automatic temperature regulation should be provided for controlling and maintaining the minimum temperature requirements. Such a system should be provided in all principal rooms occupied. The system should be applied to all direct radiators (if used) within the rooms and to all indirect radiators or mixing dampers where the system of heating and ventilation used makes it possible.

B. *Fire Protection System*

1. Apparatus

Automatic sprinkler systems with pressure heads located in the proportion of one to about 100 square feet of floor area should be located in rooms of possible danger source; or standard stand-pipe system with no part of building more than 75 feet distant from nearest hose outlet, 2½-inch hose—hose racks and valves exposed in corridors; gravity tank on roof where insufficient water pressure is provided. One fire extinguisher to every 5,000 square feet of floor area. Fire-alarm stations on each floor in plain sight. The latter should be connected with city fire department.

2. Fireproofness

The desirable standard is a building constructed of fire-proof materials which offer a maximum of resistance to fire. The most stringent requirements of all fire prevention laws should be observed.

3. Fire Escapes

Enclosed fireproof stairwells are required in all buildings of two stories or more. Exterior fire escapes cannot be considered an adequate substitute for such stairwells, though they are recommended where no other provision has or can be made.

4. Electrical Wiring

Should be installed in accordance with the latest rules of the National Board of Fire Underwriters. These rules concern the nature and place of intake, insulation, number and kind of outlets, location of switches, meter, cutout and cabinets.

5. Fire Doors

Self-closing fire doors at all places of probable danger, especially about heating plant; fire glass windows should be below or should overlook fire escapes.

6. Electric Lights and Signs

Red globe exit lights and hall arrows for fire exits where necessary. The letters on signs should be of plain block type not less than four inches in height.

C. *Cleaning System*

1. Kind

Vacuum systems preferable.

2. Installation

Permanent piping so that every part of building is not more than fifty feet from a hose outlet. Hose should be $1\frac{1}{4}$ inches in diameter stiffened with spiral wire and 50-75 feet long. Discharge into furnace. If there is no vacuum system, adequacy of equipment should be considered. This should include a sufficiency of the following materials: floor brushes, dust cloths, mops, mop-wringers, sweeping compound, carpet-sweepers and the like. Built-in waste chutes are desirable in the construction of any building.

3. Efficiency

Should be judged by general cleanliness of floors, walls, equipment, windows, lighting fixtures, storerooms, basement and toilet rooms. Basements piled with rubbish and discarded equipment, storerooms littered with papers and other inflammable materials and kitchens with rusty and dirt-covered equipment are indications of exceedingly low efficiency.

D. *Artificial Lighting System*

1. Gas and Electricity

Gas for stairways, corridors, auditorium, and fire exits. Electricity for the entire building

2. Outlets and Fixtures

a. Outlets placed at all points of constant need, such as pulpit, organ, choir gallery, orchestra, stage, corridors, etc., with audience rooms amply provided.

b. Each class room should be equipped. Nine outlets for classrooms 24 x 32. Six outlets for classrooms 20 x 24.

c. Outlets in corridors should be 20 to 25 feet apart. Fixtures should be installed in each vestibule.

d. Stage of School Assembly Auditorium

(1) Combination of regular (foots and borders) and modern overhead direct system with units in form of movable olivettes, nitrogen lamps, adjustable spots and baby spots.

(2) Switchboard. One of the latest approved design, including dimmers. Should be placed at right of stage in such position that it will not interfere with any type of proscenium arch.

(3) Sunken trough with adjustable floor covering for foot-lights.

(4) Music stands should be equipped with a light of one or two candle power so shaded that all light will be shut off from line of vision of audience and will not interfere with any general or special lighting scheme.

e. Church Auditorium

(1) Pulpit and console lights on separate switches from auditorium lights.

(2) Special movable choir lights ($\frac{1}{2}$ candle power) to be suspended over singers in front seats (auditorium) during stereopticon song service, thus allowing use of hymnals, octavo or oratorio scores in darkened church.

f. All fixtures of each room should harmonize with other decorations and equipment. Simplicity yet appropriateness should be the end sought.

g. Switch Controls

(1) Switches near entrances; each cluster with an individual switch where need so dictates. Original installation of a maximum of switches should tend to lower maintenance costs.

(2) Switchboard, equipped with lock and key, and provided with individual switches for purpose of controlling all lights on any floor should be placed at most convenient exit point in the building.

h. Stereopticon and Motion Picture Wiring Standards

(1) In audience rooms utilized for moving-picture or stereopticon purposes duplicate switch should place artificial lighting under operators' control.

(2) Wall or base plugs for stereopticons should be provided in classrooms.

(3) Permanent wired signal light from speaker's stand to operator of stereopticon.

3. Method and Illumination

a. Semi-indirect or indirect system.

b. Standard illumination

(1) For classrooms, study and library rooms, 9-foot candles at each desk without objectionable glare or shadows.

(2) For auditorium or assembly, 3-foot candles at each pew or audience chair.

c. Source of light should be located out of direct line of vision from any place in audience chambers or balconies.

d. Ample overhead lighting for choir gallery which may be dimmed during sermon or address.

e. Visualization equipment for church auditorium

- (1) Ordinary flood lights operated from side galleries.
- (2) Auditorium lighted in sections with dimmers.
- (3) Facilities for illuminating special art windows by outside lighting shining through into semi-darkened church.

E. *Water Supply System*

1. Drinking Fountains

Automatic bubbling fountains, the apparatus of which prevents the users from touching mouth or lips to the metal should be provided in reasonable numbers. The standard of one fountain for each 75 to 100 children should be observed in the school. Fountains are preferably wall-attached and placed at varied heights. Located in corridors of community house and school house. Easy of access to classrooms, playrooms, gymnasium, playground and to dressing rooms of stage.

2. Washing Provisions

Washbowls should be provided in all toilets and adapted to the heights of children. They should also be located in janitor's room and in kitchens and workrooms. Sinks should be located in kitchens and boiler rooms. Slopinks are essential in janitors' closets on each floor.

Soap dispensers, ready for use and a sanitary towel system are required for each sink and washbowl.

3. Hot and Cold Water

Hot and cold water should be provided at all washbowls and sinks. The standard hot water equipment provides hot water instantaneously on demand.

F. *Toilet System*

1. Distribution, Location and Accessibility

The majority of all toilets should be placed in basement, or on the ground floor, but at least one seat for each sex should be provided for emergency on each floor. Conveniently placed with reference to stairways and corridors and readily accessible to large audience rooms. Offices, teachers' rooms, auditoriums, mothers' rest rooms, gymnasium dressing rooms and janitor's quarters should be provided with toilet facilities. Separate toilets convenient to kindergarten classroom. Toilets should be easily accessible to dressing rooms off auditoriums or assembly rooms.

2. Fixtures

a. Seats

Porcelain seats of open type with individual automatic flush are standard. Seats should be enclosed in individual booths with light swinging doors. Each booth should have its toilet paper rack and be equipped with toilet paper. Seats should vary in height so that young children may be accommodated.

b. Urinals

Sides and backs of material which is non-absorbent and easily cleaned. Individual urinal stalls sunk to floor level preferable. Individual sanitary flush attached to each stall.

3. Adequacy and Arrangement

Placing of seats and urinals should be such as to avoid obstruction of light. Should be arranged along walls in single rows. Urinals at point nearest door, seats farthest from the door. Care should be taken to provide a sufficient number of seats and urinals. For the toilet equipment of the school the following rule should be observed:

One seat for each classroom or for each 30 girls and one-half seat and one urinal per classroom or for each 30 boys.

4. Seclusion

There should be non-communicating, sound-proof walls between adjoining rooms provided for the two sexes. Entrance to toilet rooms properly screened. Partitions and swing doors for each seat. Toilet rooms should be structural units from which no sound emanates to remainder of building.

5. Sanitation

Separate stack, duct and fan for ventilating purposes. All plumbing should be exposed. Plumbing utility chamber at rear of all rows of seats. Walls and floors should be non-absorbent, non-corrosive and damp-proof. Tile or moisture-proof cement overlaid with hard asphaltum is most desirable floor. Wainscot, same material as stall partitions or white tile. Walls, faced with glazed brick, absolutely white. Ceiling sound-proof and odor-proof.

G. Other Service System

1. Clocks and Signal System

a. Clocks

One for each classroom, for each social room and one in back of auditorium and school assembly room; in church foyer and main vestibule of religious school. Community clock in church tower desirable.

b. Bells and Gongs

For assembly, dismissal and fire-drill signals. At least one button on each floor for fire signals. Doorbell system for call of janitor.

2. Church Bells and Chimes

a. Ringing should be made readily possible without inconvenience. Housing for chimes player should involve full consideration of accessibility, lighting, heating and freedom from interruptions.

3. Telephones

a. Public Telephone. At least one public telephone on each floor, preferably in booths. Telephone in pastor's study and in church office.

b. House Inter-communicating Telephone. When size of plant dictates need of house telephone, a switch-board should be located in church office.

c. Hearing Devices for the Deaf. Hearing provision should be made for the deaf in a few seats in all large audience chambers.

4. Service Lifts and Elevators

Where arrangement of rooms demands service lifts, dumb-waiters, book elevators, or freight elevators should be provided. Small electrically operated passenger elevators are desirable in large institutions especially where a roof garden is maintained.

H. Service Rooms

1. Workshops

a. Workshop of Superintendent of Buildings, Engineer or Janitors

This shop should be equipped with tools and janitor's materials and supplies needed for repair work on any of the mechanical systems installed. Efficiency in the storage and handling of supplies should be possible through facilities provided. The equipment may consist of a carpenter's bench, vises, anvil, set of plumbing tools and the like.

b. Workshop for Stage Properties

Where additions to costumes and properties are planned the equipment should include

Work bench for (1) wood workers and (2) electricians; drafting table; sewing machine; dyeing equipment; cutting equipment; pressing equipment; closets, drawers, chests; tool outfits; stenciling equipment, and painting equipment.

This shop should provide at least 600 square feet for the use of church and community workers in making scenery, costumes, properties, etc. It should be readily accessible to the stage.

2. Service Office

Private room for superintendent of buildings and grounds. Janitors' or engineers' room should be conveniently located near heating plant and toilet rooms. Equipped with wash basin, sink and individual bath, thermostat, telephone, desks, record files, and other supplies. Signal system connects this room with entrances.

3. Fuel Room

Sufficiently large to hold season's supply of fuel; convenient to heating plant and to street or driveway in order to permit dumping of fuel directly from wagons. Dumping should be so accomplished as to eliminate necessity for levelling of fuel.

IV. CHURCH ROOMS

A. Convenience of Arrangement

1. Small church rooms should be so arranged about the foyer and auditorium that they are easy of access to exits and main auditorium.
2. They should be so arranged that they can be made to serve as separate rooms and also in conjunction with the main auditorium either as additions to the main room or as anterooms for various purposes.
3. At least two different exits out of main auditorium should be provided.

B. Church Auditorium

1. Size and Shape

a. Size adequate with expansion for maximum number of people to be served and for estimated growth over the period of years to be covered by life of the building. Should allow a minimum of from seven to nine square feet of floor space for each individual, exclusive of pupil platform, chancel, choir gallery, etc.

b. Shape

Rectangular, square, or semi-circular, with the pulpit and choir visible from all seats. If rectangular, the length should never be more than twice the width.

2. Seating

a. Pews of auditorium chairs on main floor or in balcony.

b. Seats placed so that all auditors face pulpit.

c. Not more than twelve seats between aisles.

d. Seats should be provided with book-racks, communion cup holders and envelop containers.

e. Kneeling racks should be provided where required.

f. All pews should be distinctly numbered or lettered.

3. Illumination

a. The natural lighting should be such as to provide at least three-foot candles of light for all seated in the audience chamber and in the balcony. This result can often be secured by overhead lighting.

b. Windows to the right, left and rear should furnish the bulk of all natural lighting. No plain glass windows should be so near the front of the audience chamber as to cause auditors to face glaring light. Care should be taken to provide for elimination of all objectionable, irritating light in the eyes of auditors from windows in front of auditorium and in the eyes of pastor, speaker and choir from windows at the rear of the auditorium.

c. All decorative windows should conform to the best standards of art and biblical illustration. Memorial windows should be indicated by small tablets located underneath the windows and not on the memorials themselves.

4. Walls and Ceilings

In good condition, free from cracks and breaks. The color scheme should be consistent throughout and in harmony with the remainder of the building. It should be pleasing, restful, and suggestive of worship and in harmony with standards set for decorative attractiveness of internal structure. Recency of decoration and elimination of all discolorations and defacements is essential.

5. Floor of Auditorium

a. Should be noiseless and durable.

b. Cement overlaid with patent process or battleship linoleum is most desirable. Hard maple or hard pine is the most satisfactory wood. Where wood is used, aisles should be covered with linoleum or carpets.

6. Balcony
 - a. Should be located only across rear of auditorium seating 300 and less than 400, and on three sides of auditorium seating more than 400.
 - b. Front of balcony should be about 15 feet from floor.
 - c. In evangelistic churches there should be direct stairways from balcony to platform.
 - d. Seats should rise to afford perfect vision to a point at center of platform.
7. Pulpit or Altar and Platform
 - a. Form to be determined by the denomination of the church and the interior finish of the auditorium.
 - b. Platform

Large enough to provide for choruses, special service pageants, and accessible from halls or dressing rooms on both sides. High enough to give all parts of auditorium easy view of speaker. A minimum height of 3 feet which should increase in direct proportion with the size of the auditorium where the auditorium floor is level.
 - c. Movable rails.
 - d. Movable furniture, such as chair stalls, lectern, pulpit, litany desk, organ console, etc.
 - e. If construction of stage levels is necessary, they should be so constructed as to appear as an integral part of the architectural scheme.
 - f. Appropriate chairs; at least three in number.
8. Baptismal Equipment
 - a. Form to be determined by denomination of the church.
 - b. Should be in plain view of congregation.
 - c. If for immersion, there should be provision for
 - (1) Separate dressing rooms for each sex with adjoining toilets.
 - (2) Controlled temperature of the water.
 - (3) Passage to and from baptistry concealed from congregation.
 - (4) Appropriate robes and footgear (rubber).
9. Communion Equipment
 - a. Service linen, individual service equipment.
 - b. Table and at least three chairs. In harmony with interior finish of auditorium.
 - c. Chancel or communion rail with kneeling steps where required.
10. Organ
 - a. Modern pedal pipe organ, electric blower of ample capacity.
 - b. Specifications for size, manuals, stops, organ divisions and mechanical features should follow details as given in the Appendix I, pages 54-59.

The following generalized standards are desirable for auditoriums of varying sizes as indicated:

STANDARDS FOR TWO MANUAL PIPE
ORGAN WITH ECHO

Suitable for Auditorium Seating 600 People or Less

Great Organ

- 1 Open Diapason—8 feet.
- 3 Strings—two of 8 feet each, one of 4 feet.
- 2 Flutes—one of 8 feet, one of 4 feet.
- 1 Reed—8 feet.

Swell Organ

- 1 Bourdon—16 feet.
- 1 Diapason—8 feet.
- 4 Strings—three of 8 feet each, one of 4 feet.
- 3 Flutes—one of 8 feet, one of 4 feet, one of 2 feet.
- 1 Reed—8 feet.
- 1 Vox Humana—8 feet.

Echo Organ

- 2 Strings—8 feet each.
- 2 Flutes—one of 8 feet, 1 of 4 feet.
- 1 Vox Humana—8 feet.
- Chimes.

Pedal Organ

- 1 Diapason—16 feet.
- 1 Bourdon—16 feet.

STANDARDS FOR A THREE MANUAL PIPE
ORGAN WITH ECHO

Suitable for Auditorium Seating 600 to 1,000 People

Great Organ

- 1 Open Diapason—8 feet.
- 2 Strings—one of 8 feet, one of 4 feet.
- 3 Flutes—two of 8 feet each, one of 4 feet.
- 1 Reed—8 feet.

Small Organ

- 1 Bourdon—16 feet.
- 2 Diapasons—one of 8 feet (open), one of 8 feet (stopped).
- 3 Strings—8 feet each.
- 1 Flute—4 feet.
- 2 Reeds—8 feet each.
- 1 Vox Humana—8 feet.

Choir Organ

- 1 Diapason—8 feet.
- 2 Strings—8 feet each.
- 4 Flutes—two of 8 feet each, one of 4 feet, one of 2 feet.
- 2 Reeds—8 feet each.

Echo Organ

(See Two Manual Specifications)

Pedal Organ

- 2 Diapasons—one of 16 feet, one of 8 feet.
- 2 Bourdons—16 feet each.
- 1 String—8 feet.
- 1 Flute—8 feet.

STANDARDS FOR A THREE MANUAL PIPE
ORGAN WITH ECHO

Suitable for Auditorium seating 1,000 people or more

Great Organ

- 3 Diapasons—one of 16 feet (open), one of 8 feet (open),
one of 8 feet (string).
- 3 Strings—8 feet each.
- 4 Flutes—two of 8 feet each, one of 4 feet, one of 2 feet.
- 1 Reed—8 feet

Swell Organ

- 1 Bourdon, 16 feet.
- 2 Diapason—one of 8 feet (open), one of 8 feet (stopped).
- 4 Strings—8 feet each.
- 4 Flutes—one of 8 feet, two of 4 feet each, one of 2 feet.
- 2 Reeds—8 feet each.
- 1 Vox Humana—8 feet.
- 1 Mixture—three ranks.

Choir Organ

- 1 Diapasons—8 feet.
- 4 Strings—8 feet each.
- 4 Flutes—two of 8 feet each, one of 4 feet, one of 2 feet.
- 2 Reeds—8 feet each.

Echo Organ

(See Two Manual Specifications)

Pedal Organ

- 3 Diapasons—two of 16 feet each, one of 8 feet.
- 2 Bourdon—16 feet each.
- 1 String—8 feet.
- 2 Flutes—8 feet each.
- 1 Reed—16 feet.

- c. Organ bench with music shelf of same material as casing.
- d. The proper placing of organ should include:
 - (1) Visibility of pipes.
 - (2) Ample speaking room for organ.
 - (3) Proper placing of pipes with relation to each other.
 - (4) Proper placing with relation to the choir.
- e. The placing of organ console should conform to the following standards:
 - (1) It should be movable.
 - (2) It should hold a strategic position for choir leading.
 - (3) It should hold a strategic position for congregational singing.
 - (4) It should hold a strategic position for correlation with minister.
 - (5) It should be removable from choir gallery for pageantry.
- f. Church organ tone or voicing should be safeguarded.

g. Organ Extensions

- (1) 2nd organ in gallery—echo organ.
- (2) 3d organ in choir room—set of pipes for processional and recessional.
- (3) 4th organ (2d console) in school assembly room.

h. Grand piano, in tune with organ, and placed in choir gallery or on front floor of the church auditorium.

11. Choir Gallery

a. Size

- (1) Large enough to seat one-eighth to one-tenth of capacity of auditorium, i. e.:
600 capacity—60-75 choir seats.
1,000 capacity—100-125 choir seats.
1,500 capacity—150-190 choir seats.

- (2) It should also accommodate organ console and grand piano.

- (3) Arranged so that curtains will close all but front for solo or quartet work.

- (4) Large enough platform space to accommodate pageants.

b. Location

Immediately behind pulpit-platform, separated therefrom by curtains and by its own 2-feet elevation.

c. Construction

- (1) Built at one or two levels, with temporary seats clamped to risers, all of which may be rearranged for special song services, festivals, etc., or entirely removed for pageant production, thus furnishing three floor areas within stepping distance of each other:

- (a) Pulpit platform.

- (b) Choir gallery floor.

- (c) Choir gallery floor.

- (2) Easy of access for processions, pageants, etc., through audience room or from choir rooms on either side.

- (3) Inclined plane approaches preferable to stairways.

d. Equipment

- (1) Individual seats with rack (back of chair) to hold octavo music and hymnals when not in use.

- (2) Seats for adults and children.

- (3) Storage space for seats and risers.

- (4) Orchestral stands.

- (5) Conductor's stand and elevation.

- e. Neutral toned hangings or a back drop to cover organ and form background for pageant.

12. Choir Rooms

a. Dressing rooms with entrance directly from street.

- (1) One room for boys and men (general rehearsal room) and one room for girls and women, both to be provided with:

- (a) Toilet facilities.
- (b) Wardrobes containing individual lockers or hooks for choir gowns, etc.
- (c) Seats and tables.
- (d) Rugs and pictures to make room attractive.
- (e) Extra hooks and shelves along walls for pageant costumes.

(2) The dressing room for boys and men should be the general rehearsal room. The room should be sound-proof and the acoustic properties should be satisfactory. It should be equipped for this purpose with:

- (a) Grand piano.
- (b) Seats for all.
- (c) Standing room for entire choir in which to form processional.
- (d) Organ extension played from regular organ console.
- (e) Filing music cabinets for octavo and oratorio scores (similar to those used for talking machine records).
- (f) Desk, card catalogue, and repair and marking equipment for secretary and librarians.
- (g) Director's office, small inner room, off from rehearsal room.
- (h) Adequate artificial lighting.
- (i) Easy and well-lighted approach to choir gallery.
- (j) Signal or buzzer system from organ to rehearsal room.

13. Acoustics

If acoustics are poor there should be evidence of attempts to remedy them, by such devices as sounding-boards behind the pulpit, reverberation pads or nets, etc.

14. Visualization Equipment

a. Stereopticon Equipment (separate unit from moving-picture machine)

- (1) Operated from side gallery on curtain at side front.
- (2) Machine. Any standard make.
- (3) Illuminants.
 - (a) For pictures up to ten feet in dark room, 400 Mazda lamp.
 - (b) For pictures up to thirteen feet in dark room, 1,000 Mazda lamp.
 - (c) For pictures over thirteen feet in dark room, arc lamp for direct current and Monoplane lamp for alternating current.

NOTE—For daytime projection where a certain amount of diffused light is unavoidable decrease diameter of picture by 25 per cent.

- (4) Lens. Should be half-size objective lens of standard make.
- (5) Equipment will vary according to the size of the room.

b. Moving Picture Equipment**(1) Booth**

- (a) Fire-proof according to the requirements of the town or city.
- (b) Material. It should be completely lined with asbestos or steel.

(2) Motion Picture Projectors

- (a) Portable machines have not as yet been perfected and are consequently not standard equipment.
- (b) Standard Machines

All these machines require the use of a fireproof booth. Two of the first-class machines are the Simplex Motion Picture Projector with incandescent lamps and the Powers Cameragraph with incandescent lamps.

c. Screens

- (1) Wall on which screen can be painted
- (2) Opaque, white screen of cloth.
- (3) Aluminum screen to be used only when colored pictures are not shown and where angle of view is not over 60 degrees. Preferable for motion pictures in long narrow audience room.
- (4) Half-tone screen is probably as good for both stereopticon and motion picture use as any single screen.
- (5) Curtain to be rolled from floor up and be entirely invisible when not in actual use.

d. Provision for Darkening the Windows of all rooms in which visualization equipment is to be used.**15. Cloak or Check Room**

Convenient to entrance and so that people may pass by on way to or from the auditorium without confusion.

Should be equipped to permit use of a system of checking which should include provisions for wet umbrellas and rubbers.

C. Chapel or Small Assembly Room

A room with a seating capacity about one-quarter of main auditorium. Movable chairs. Equipped to meet the needs for which the main auditorium is too large.

D. Parlor and Church Board Room

A room large enough for meetings of the church board, for larger committees, and to serve as a church parlor. Fitted with long table, chairs, carpet and appropriate decorations. Should be cozy in nature and equipped with comfortable furniture.

E. Pastor's Study

Light, well ventilated and well heated, desk, filing cabinets, book-cases, small conference table and chairs. Convenient to church office but separated by sound-proof walls. Lavatory and toilet adjoining.

F. Church Office

Room for the church secretary equipped with desk, safe, filing cases, card index of membership, etc.

G. Church Vault

To be used by the pastor and the church officials for the preservation of church statistics and records. Should be damp-proof and fire-proof. Should adjoin church office.

V. CHURCH SCHOOL ROOMS**A. Location and Connection****1. With Church Building**

School should be maintained in a separate wing of the building or in a separate building, connected with the main church building by a loggia or cloister. This loggia should be provided with a movable sash for enclosing it in winter.

2. With Other Schoolrooms and Facilities

Church schoolroom should be so located as to be easy of access to exits, drinking fountains, toilets and auditorium. Each school room should open into exit hall without entering other rooms.

3. Assembly room should be located on ground or first floor and be easily accessible to classrooms and exits. Assembly room should have a number of entrances connecting with a wide maximum foyer at rear of hall and may be joined on two sides with a wide foyer.**B. School Assembly Room****1. Size and Shape**

Seating capacity sufficient to accommodate entire school with provision for community growth. With rear balcony or with rear and side balconies. If the hall is rectangular its length should be approximately one-third more than its width. An assembly room, the main floor of which seats 300, is large enough to have a balcony across the rear. Where the main floor of an assembly room seats 400 or more a balcony on three sides may be provided.

2. Seating

a. Movable. Single chairs easily combined into banks by individual chair clamps. Variations in aisles should be made possible.

b. Folding type.

c. Size. The space between rows (from back of one seat to back of seat in front) at least three feet. Width of seat at least twenty inches.

d. Accessories

(1) Hat racks.

(2) Suitable letterings for aisles and numbering of seats.

3. Illumination, Window Placement and Line of Vision

Adequate for good reading or study light in all sections of the room. Three-foot candles is standard illumination. Not placed so far toward the front of the room or in the front wall that

audience faces direct light or cross lights. Pillars and posts should be so placed as not to obstruct illumination or to break the line of vision to the stage.

4. Walls, Ceiling and Floor

a. Walls and Ceilings

- (1) These should be in good condition, free from cracks and breaks. Free from discolorations.
- (2) Decoration should be reasonably recent. General trend of decoration should be middle value, pure neutral. If light conditions are such that color is desired, modify the neutral slightly with whatever hue is needed.
- (3) Good reproductions of masterpieces of painting and sculpture appropriate for a church school should be provided.

b. Floor

- (1) See standards for Church Auditorium Floor, Item IV, B, 5.
- (2) Ramp is necessary except possibly in very small assemblies. Ramp should begin about 20 feet back from the stage with a 6-inch rise every 10 feet to rear of hall. Adjustable (level or inclined floor) controlled by hydraulic pressure meets standard requirements.
- (3) Special Orchestra and Chorus Space
Movable sectional floor to cover depressed orchestra pit with risers on either side extending above floor level.

5. Stage

a. Size

- (1) Height. If seats of audience hall are placed on an inclined plane, maximum $2\frac{1}{2}$ feet, if flat or oval at least $3\frac{1}{2}$ feet.
- (2) Width of stage should be double the width of the proscenium opening. If opening is 30 feet wide, there should be about 15 feet on either side of it in order to have adequate room for assembling participants, moving scenery, lighting purposes, etc.
- (3) Depth. Should approximate width of proscenium opening.
- (4) Back of stage should not be the outside wall of building, but should be a wooden partition harmonizing with general decorative scheme with passageway at least behind it. Sliding doors opening into room on stage level which, when partitions are open, can be used as an extension or inner room.
- (5) A set of risers for accommodating the chorus or for special church school exercises. A set of movable risers is desirable.

b. Character

- (1) Level (not an inclined plane).
- (2) Soft wood floor.
- (3) Elimination of apron entirely or reduced to a minimum.

c. Proscenium Arch

- (1) Size. Minimum opening of 30 feet, with a minimum height 20 feet. Forty-foot opening requires at least 25 feet.
- (2) There should be sufficient space above the opening for the raising of drops without rolling or tripping them. Space above the stage should be used for this purpose only. Portable, adjustable pilasters and adjustable piping for curtain hanging are desirable.

d. Scenery

Should consist of curtain, pylon sets, sky cyclorama, screens, box sets, wings and drops. Most desirable scenery combination includes curtain, pylons and sky cyclorama. Scenery with a minimum of constructed parts and a maximum of lighting effects and modern equipment lending itself to the greatest amount of flexibility, is most desirable.

e. Curtain

A draw curtain is preferable. The curtain should be fire-proofed. It is desirable to have a regular asbestos fire curtain in addition.

f. Combination Steps, Extension Stage, Ramps, etc.

There should be no steps leading to the stage from the sides or back, but sectional steps leading from the audience room proper to the stage. An extension stage is frequently found desirable as well as inclines and ramps that can connect stage with audience room proper.

g. Portable Small Stage

Provision should be made wherever possible for a portable stage for the opposite end of the hall from the stage proper.

h. Dressing Rooms

Good size dressing rooms for men and women, located near the stage. These rooms should be equipped with tables, mirrors, and ample clothes-hooks or racks.

i. Buzzer System

Electrical buzzer connections with orchestra, dressing rooms and lights operator at rear of room.

6. Musical Equipment

a. Piano

- b. Pipe organ. This instrument may take place of orchestra when latter cannot be maintained.

- c. Music stands with light equipments so shaded that all light will be shut off from line of vision of audience.

7. Visualization Equipment

For standards see Church Rooms, item IV, B, 14.

8. Auxiliaries to Assembly Room

- a. Storage Room for Risers and Seats
Easily accessible to audience room.

- b. Costume Room—Property Room
Rooms with wardrobes to keep costumes and properties safe and in good condition are essential.

c. Bulletin Board

One or more illuminated bulletin boards should be installed outside of buildings.

d. Box office for special benefits should be provided.

C. *Classrooms and Department Assembly Rooms*

1. Adequacy of Number

a. Department Assembly Rooms

Separate for each of the children's departments, beginners, primary and junior; also in larger schools (300 or over) for the higher departments, intermediate, senior and young peoples'.

b. Classrooms

There should be enough classrooms to supplement the use of the assembly rooms so that classes should not exceed 30 members except in the adult division. Separate classrooms should be provided for every class of the junior and all higher departments, also for the cradle roll and teacher training classes.

c. Soundproofness

Where space is not available for separate assembly rooms for the different departments in addition to classrooms, it is possible by means of sliding doors (well fitted) to make an assembly room from two or three classrooms. It is desirable that each class have a room which it feels to be its own and that the room be free from the disturbances of other class activities which arise when classes are separated by curtains or screens.

Church school classes should have working conditions as adequate as those of any school.

2. Size and Shape

Should provide 15 square feet of floor space and 200 cubic feet of air space per child.

A room 22 feet wide by 28 feet long by 12 feet high will provide for 30 pupils and is the best shape for instruction purposes.

3. Seats and Desks

a. For beginners and primary departments tables and chairs of varying sizes are desirable. Individual, movable and adjustable seats and desks for junior and intermediate departments. For other departments the kind of equipment should be determined by size of class and mode of work.

b. Desks for teachers should be of adequate size with drawer space arranged for various size papers. Should not have platform. Teacher's chair of same material and finish as desk.

4. Illumination and Window Placement

a. Glass area should be one-fifth to one-quarter area of floor—determined by latitude and by the presence or absence of light obstructions.

b. Windows

When furniture is permanently attached to floor, light should come from one side only, i. e., from the left of the seated

student. With movable furniture windows should be located at left and rear or at left only. Windows should not be so near the front wall as to cause students to face the direct light. A dead wall space of six to seven feet is desirable at the left front. Wide mullions and piers should be avoided so as to prevent the casting of shadows. Windows should be of plain glass except where fire regulations require fire wire glass. Windows should be sufficiently near the ceiling to permit the complete lighting of the opposite side of the room. For example, the windows of rooms which are 24 feet wide should extend close to ceiling of a 12-foot height. Windows should begin at a height of $3\frac{1}{2}$ to 4 feet from the floor.

- c. Shades should be adjustable from center of the windows. The color should be bisque or light sage.

5. Walls and Ceilings

Here should be considered plastering, finish, texture, condition, picture mold, chair rail and dado. Hard, smooth, non-glass plaster is the standard with cement plaster for dado with avoidance of grooves and ledges. Deadened ceiling where "floating ceiling" is used.

6. Floors

Cement, overlaid with battleship linoleum or hardwood, durable, well-joined and not dust retaining, are desirable standards. Sanitary covers should be provided at junction of walls and floors. All floors should be sound-proofed.

7. Blackboards and Bulletin Boards

- a. Blackboards should be of highest grade slate or ground glass, dull black. Located on front and side of room; height of chalk rail, for children 4 to 6 years of age, 24 inches; 6-8 years of age, 26 inches; 8-10 years of age, 28 inches; 10-14 years of age, 30 inches; 14 years or over, 32-36 inches. Amount of surface determined by the number of children accommodated; light curtains for covering boards on dark days or when not in use.

- b. Bulletin Boards

Space not provided with blackboards or space above boards may be provided with cork bulletin boards for illustrative purposes.

- c. Picture Rails

Provision for picture rails in the kindergarten and primary rooms on which pictures may be placed during the class session.

8. Doors and Closets

- a. Doors should swing in both directions or open outwards; no thresholds.

- b. Closets and Built-in Bookcases

There should be at least one in each room, large enough to provide for supplies, books, globe, and maps when not in use. Located as near the teacher's desk as construction permits.

9. **Instructional Equipment**

Provision for maps, stereopticon, globes, display exhibits, scrap-books, sand-table, modeling clay, and the like according to needs of class or division. Pianos for all assembly rooms.

D. *Cloak Rooms and Wardrobes*

Cloak rooms should adjoin classrooms of little children and be under teacher control. Cloak rooms should provide ample space for winter wraps for each child. The heights of hooks should be adapted to heights of children. Umbrella racks should be provided. Cloak rooms should be easily accessible to children and so arranged as to avoid confusion. Cloak rooms should be provided with natural and artificial light.

E. *Church School Superintendent's Office*

1. Should be located on first floor near main school entrance. Should consist of a combination reception room and secretary's office and an inner private office. Equipped for efficient transaction of the school business. Cabinets for filing, desk and telephone connections should be part of equipment.
2. Workroom for printing, mimeographing, etc., with shelves for stock equipment, should connect with this office.

F. *Supply Rooms*

Conveniently located for janitor and superintendent, ventilated and fire-proof. These should be adequate in size and number. Provided with ample facilities for classified and efficient storage. A church school requires a maximum of storage space.

VI. COMMUNITY SERVICE ROOMS

A. *Rooms for General Use*

1. **Recreation and Dining Room**

- a. **Size.** Large enough to seat at table at least 50 per cent. of the people served by the community church. Allow ten square feet per person to be served.
- b. **Equipment.** Material for take-down tables, temporary platform, piano, folding chairs.

2. **Kitchen**

- a. **Location.** Convenient to the recreation and dining room. Size should be one-tenth of the area of the larger room. Separate service entrance should be provided.
- b. **Equipment.** A range and where possible gas plates. Large kettles and other necessary utensils for cooking for large groups. Dishes, silver and linen for maximum number to be served. Sinks, hot and cold water, dish washing facilities and draining racks, etc. Table for scraping dirty dishes with garbage receptacle underneath. Broad and sufficient serving space between kitchen and dining room with counter-shelves for quick service. Two-way swing doors between kitchen and dining room with kicking plate and glass panel. Refrigerator equipment. Vegetable storage. Steam kettles, electric potato paring machines, electric cream freezers and electric dishwashers are desirable equipment.

3. Library and Reading Room

- a. Location. Near main entrance or with separate outside entrance.
- b. Equipment
 - (1) Library. Books and periodicals, reference books, encyclopedias, church histories, and other church references, adjustable book shelves, librarian's desk, card catalog, typewriter, repair and marking equipment, charging system and records.
 - (2) Reading room. Tables or desks preferably with seclusion partitions, individual reading lights, comfortable chairs, racks for wraps and umbrellas, holders for newspapers and magazines.

B. Rooms for Social Service

1. Women's Social Room and Mother's Room

Equipped with tables, chairs, couches, and furnished in a way to make it an attractive meeting place for women's clubs and organizations. Should adjoin the day nursery room. Should have large enough closet or anteroom to enclose sewing machines and other equipment which might be used by different organizations using the room.

2. Girls' Clubrooms

- a. Location. Accessible and visible from street, with separate outside entrance. Convenient to library.
- b. Equipment should consist of chairs, tables, newspapers and magazine racks, trophy cases and bulletin board. Wardrobes or closets to be used by separate organizations for keeping costumes, and other equipment. Pictures and pennants to make room an attractive meeting and gathering place for girls.

3. Men's Clubroom

- a. Location. Accessible and visible from the street. Direct entrance from outside of building. Convenient to library.
- b. Equipment should consist of comfortable chairs, tables, newspaper and magazine racks, chess tables, pictures, rugs, etc., to make the room an attractive lounging and rest room for men.

4. Boys' Clubrooms

Equipped similarly to the girls' clubroom.

5. Nurses' and Rest Room

- a. Location. Convenient to school classrooms.
- b. Equipped with adequate first-aid outfit, chairs, reclining couch, wash stand with hot and cold water and toilet.

6. Day Nursery

- a. Located near mothers' room.
- b. Equipped with cribs, kindergarten chairs and tables, toys, etc.

7. Civic Center Room

- a. Used as a room for evening classes in citizenship, for social gathering and special talks, and for committees and other bodies engaged in community work.

- b. Equipped with text books, writing materials, lantern and reflectoscope, signs and placards, and other materials used in civic instruction. Pictures with American ideals should predominate.

8. Social Workers' Office

This room should be equipped with desk table and chairs for conferences and small group meetings. Filing cases for card records of visits, cases, and follow up work. A small reference library of special books to be referred to in personal consultations is desirable.

C. Rooms for Recreation and Athletics

1. Gymnasium

- a. Location. On ground floor, accessible from playground by outside door.
- b. Adequate dimensions are 50 feet by 75 feet by 16 feet. Where balcony is provided for audience or for running track, the height should be increased to 22-25 feet. Walls light colored. Windows and lights protected by heavy large meshed wire. Where support columns are needed they should be padded to a height of 6 feet. Should be sound-proof.
- c. Equipment. Provision for basketball, volley ball, indoor baseball, and other group activities. Pulley weights, horizontal and parallel bars, climbing ropes, and ladders, jumping standards, flying rings, dumb bells, Indian clubs, boxing gloves, quoits, etc.
- d. Athletic Director's office. Fully equipped and located so as to control all athletic rooms.

2. Locker Rooms

Adjacent to the gymnasium. Separate for sexes. Steel lockers. Ventilated. Minimum of large dressing lockers with maximum of small storage lockers.

3. Showers

Side showers, regulated with ease from entrance, curtained entrances, adjacent to locker rooms. Hot and cold water should be obtainable at all times, at each shower. This last standard requires careful consideration when plumbing is being installed.

4. Swimming Pool

Easily accessible from locker rooms with separate entrances from each. Graduated depth. Tiled bottom and sides. Should be at least 15 by 30 feet. Provision for sanitary maintenance for frequent and adequate cleansing of the pool, for a continuous and filtered water supply and for the sterilization and laundering of swimming suits and towels should be included. Provision for constant supervision of pool while in use requires a swimming attendant's office with wide window overlooking the pool.

5. Hand Ball Courts

Provision can be made for these in a small room, e. g., 12 by 16 feet. Outdoor courts can often be made against blank walls of the building and if a concrete floor is provided can be used all year. Where separate provision is not made for hand ball, one or more wall spaces in the gymnasium should be left clear of apparatus for use with hand ball.

6. Game or Amusement Rooms

Equipped with stands for checkers, shuffle board, chess, cards and other concentration games. Where separate room is not available for these games they should be distributed through the several clubrooms. Where billiard or pool tables are installed, equipment for cues and their care should be provided. There should be space enough for chairs at sides or ends of rooms. Room 16 by 20 feet will accommodate two tables. Such a room is preferably located near physical director's office or some other room where an officer is in constant attendance. Efficient upkeep of all equipment is essential.

7. Bowling Alley

Most economically built as a pair of alleys. Should be sound-proof. Bank of seats at end for spectators and for contestants in tournaments. Two alleys require a space 11 feet 6 inches by 83 feet. Each additional alley will require an additional 5 feet 9 inches in width. Gallery at rear will be additional to the above length.

Construction Classification of the American Institute of Architects

- TYPE A A building constructed entirely of fire-resistive materials, including its roof, windows, doors, floors and finish.
- TYPE B A building of fire-resistive construction, in its walls, floors, stairways and ceilings, but with wood finish, wood or composition floor surface, and wood roof construction over fire-resistive ceilings.
- TYPE C A building with masonry walls, fire-resistive corridors and stairways, but with ordinary construction otherwise, i. e. combustible floors, partitions, roofs and finish.
- TYPE D A building with masonry walls, but otherwise ordinary or joist construction and wood finish.
- TYPE E A frame building constructed with wood above foundation with or without slate or other semi-fire-proof material on the roof.

APPENDIX I

SAMPLE SPECIFICATIONS OF ONE TYPE OF
TWO MANUAL PIPE ORGAN

Suitable for Auditorium seating 600

MANUALS—Compass CC to C, 61 notes.

PEDALS—Compass CCC to F, 30 notes.

ACTION—Electro-pneumatic throughout.

Duplex Chest.

GREAT ORGAN

1	8'	Open Diapason.....	metal	73 pipes
2	8'	Dulciana.....	metal	61 "
3	8'	Melodia.....	wood	73 "
4	8'	Gamba.....	metal	61 "
5	4'	Octave.....	metal	61 notes
6	4'	Flute d'Amour.....	wood and metal	73 pipes
7	8'	Oboe Horn.....	reeds	61 "

SWELL ORGAN

8	16'	Bourdon.....	wood	49 notes
9	8'	Violin Diapason.....	metal	61 pipes
10	8'	Rohr Flute.....	wood	61 "
11	8'	Dulciana.....	metal	61 notes
12	8'	Gamba.....	metal	61 "
13	4'	Flute.....	wood and metal	61 "
14	2'	Flautina.....	metal	61 "
15	8'	Vox Celeste.....	metal	49 pipes
16	8'	Oboe Horn.....	reeds	61 notes
17	8'	Vox Humana.....	reeds	61 pipes

ECHO ORGAN

(Played from Great Manual)

18	8'	Spitz Flute.....	wood	61 pipes
19	8'	Muted viola.....	metal	61 "
20	8'	Flute Celeste.....	wood	49 "
21	4'	Wald Flute.....	wood and metal	61 "
22	8'	Vox Humana.....	reeds	61 "
23		Chimes		

PEDAL ORGAN

24	16'	Bourdon.....	wood	30 pipes
25	16'	Lieblich Gedeckt.....	wood and metal	30 notes

COUPLERS

26	Swell to Great	31	Great to Pedal
27	Swell to Great 4'	32	Swell to Pedal
28	Swell to Great 16'	33	Swell 16'
29	Swell 4'	34	Echo "On," Great "Off"
30	Great 4'		

MECHANICALS

35 Echo Tremulant

36 Swell Tremulant
Crescendo Indicator

ADJUSTABLE COMBINATIONS

(Operated by pistons placed under respective manuals)

Piston No. 1	}	Affecting Swell and Pedal Stops
Piston No. 2		
Piston No. 3		
Piston No. 1	}	Affecting Great, Echo and Pedal Stops
Piston No. 2		
Piston No. 3		

PEDAL MOVEMENTS

- 1 Great to Pedal Reversible
- 2 Balanced Swell Expression Pedal
- 3 Balanced Echo Expression Pedal
- 4 Grand Crescendo Pedal

Organ Bench with Music Shelf of same material as Casing
Concave Pedal
Electric Blower of ample capacity

SAMPLE SPECIFICATIONS OF A THREE
MANUAL PIPE ORGAN

Suitable for an Auditorium seating 600-1,000 people

MANUALS—Compass CC to C, 61 Notes.

PEDALS—Compass CCC to G, 32 Notes.

ACTION—Electro-pneumatic throughout.

GREAT ORGAN—5" Wind

1	8'	Open Diapason	metal	61	pipes
2	8'	Doppel Flöte	wood	73	"
3	8'	Clarabella	wood	73	"
4	8'	Dulciana	metal	73	"
5	4'	Flute d'Amour	wood and metal	73	"
6	4'	Octave	metal	61	"
7	8'	Tuba	reeds	61	"

Stops 2, 3, 4, 5, 7 in Choir Swell Box

SWELL ORGAN—5" Wind

8	16'	Bourdon	wood and metal	73	pipes
9	8'	Open Diapason	metal	73	"
10	8'	Stopped Diapason	wood	73	"
11	8'	Salicional	metal	73	"
12	8'	Vox Celeste	metal	61	"
13	8'	Aeoline	metal	73	"
14	4'	Flute Harmonique	wood and metal	73	"
15	8'	Oboe	reeds	61	"
16	8'	Cornopean	reeds	73	"
17	8'	Vox Humana	reeds	61	"

CHOIR ORGAN—5" Wind (Augmented)

18	8'	Violin Diapason.....	metal	73	pipes
19	8'	Doppel Flöte.....	wood	73	notes
20	8'	Melodia.....	wood	73	"
21	8'	Dulciana.....	metal	73	"
22	4'	Flute.....	wood and metal	73	"
23	8'	Tuba.....	reeds	61	"
24	8'	Viola da gamba.....	metal	73	pipes
25	2'	Piccolo.....	metal	61	"
26	8'	Clarinet.....	reeds	73	"

ECHO ORGAN (Played from Great Manual)

27	8'	Spitz Flute.....	wood	61	pipes
28	8'	Muted Viola.....	metal	61	"
29	8'	Flute Celeste.....	wood	49	"
30	4'	Wald Flute.....	wood and metal	61	"
31	8'	Vox Humana.....	reeds	61	"
32		Chimes.....		25	notes

PEDAL ORGAN—5" Wind

33	16'	Open Diapason.....	wood	44	pipes
34	16'	Bourdon.....	wood	44	"
35	16'	Lieblich Gedeckt.....	from No. 8.....	32	notes
36	8'	Flute.....	from No. 34.....	32	"
37	8'	Octave.....	from No. 33.....	32	"
38	8'	Violoncello.....	from No. 24.....	32	"

COUPLERS

39	Great to Pedal	51	Choir 4'
40	Swell to Pedal	52	Choir 16'
41	Choir to Pedal	53	Swell to Choir
42	Swell to Pedal 4'	54	Swell to Choir 4'
43	Great to Pedal 4'	55	Swell to Choir 16'
44	Swell to Great	56	Swell 4'
45	Swell to Great 4'	57	Swell 16'
46	Swell to Great 16'	58	Choir to Swell
47	Choir to Great	59	Swell Unison in Key Jamb
48	Choir to Great 4'	60	Choir Unison in Key Jamb
49	Choir to Great 16'	61	Echo "On," Great "Off"
50	Great 4'		

MECHANICALS

62	Swell Tremulant	64	Echo Tremulant
63	Choir Tremulant		Crescendo Indicator

ADJUSTABLE COMBINATIONS

(Operated by pistons placed under respective manuals, also
by corresponding pedal pistons)

Piston No. 1	} Affecting Swell Organ with duplicate Pedal Studs
Piston No. 2	
Piston No. 3	
Piston No. 4	
Piston No. 5	

Piston No. 1 }
 Piston No. 2 }
 Piston No. 3 } Affecting Great and Echo Organs with duplicate Pedal Studs
 Piston No. 4 }
 Piston No. 5 }

Piston No. 1 }
 Piston No. 2 } Affecting Choir Organ
 Piston No. 3 }

Piston No. 1 }
 Piston No. 2 } Affecting Pedal Organ
 Piston No. 3 }
 Piston No. 4 }

Piston No. 1 }
 Piston No. 2 } Affecting Full Organ
 Piston No. 3 }

PEDAL MOVEMENTS

- 1 Great to Pedal Reversible
- 2 Balanced Swell Expression Pedal
- 3 Balanced Choir Expression Pedal
- 4 Balanced Echo Expression Pedal
- 5 Grand Crescendo Pedal

Organ Bench with Music Shelf of same material as Casing
 Concave Pedal
 Electric Blower of ample capacity

SAMPLE SPECIFICATIONS OF A THREE MANUAL PIPE ORGAN

Suitable for an Auditorium seating more than 1,000 people

MANUALS—Compass CC to C, 61 Notes.

PEDALS—Compass CCC to G, 32 Notes.

ACTION—Electro-pneumatic throughout.

GREAT ORGAN

1	16'	Open Diapason.....	wood and metal	61	pipes
2	8'	First Open Diapason.....	wood and metal	61	"
3	8'	Second Open Diapason.....	metal	61	"
4	8'	Doppel Flöte.....	wood	73	"
5	8'	Melodia.....	wood	73	"
6	8'	Gemshorn.....	metal	73	"
7	8'	Dulciana.....	metal	73	"
8	8'	Unda Maris.....	metal	61	"
9	4'	Flute d'Amour.....	wood and metal	73	"
10	2'	Piccolo.....	metal	61	"
11	8'	Tuba.....	reeds	73	"

(All stops except Nos. 1 and 2 in Choir Swell Box)

SWELL ORGAN

12	16'	Bourdon.....	wood	73	pipes
13	8'	Open Diapason.....	wood and metal	73	"
14	8'	Stopped Diapason.....	wood	73	"
15	8'	Flute Traverso.....	wood	73	"
16	8'	Viole d'Orchestre.....	metal	73	"
17	8'	Vox Celeste.....	metal	61	"
18	8'	Aeoline.....	metal	73	"
19	4'	Flauto Traverso.....	wood and metal	73	"
20	4'	Principal.....	metal	73	"
21	2'	Flautina.....	metal	61	"
22	3 Rks.	Dolce Cornet.....	metal	219	"
23	8'	Cornocean.....	reeds	61	"
24	8'	Oboe and Bassoon—round tone—soft.....	reeds	61	"
25	8'	Vox Humana—very soft—small scale.....	reeds	61	"
26	8'	Salicional.....	metal	73	"

CHOIR ORGAN

27	8'	Geigen Principal.....	metal	73	pipes
28	8'	Doppel Flote.....	wood	73	notes
29	8'	Melodia.....	wood	73	"
30	8'	Gemshorn.....	metal	73	"
31	8'	Dulciana.....	metal	73	"
32	8'	Unda Maris.....	metal	61	"
33	8'	Viola da Gamba.....	metal	73	pipes
34	4'	Flute.....	wood and metal	73	notes
35	2'	Piccolo.....	metal	61	"
36	8'	Saxaphone.....	reeds	73	"
37	8'	Clarinet.....	reeds	61	"

ECHO ORGAN

(Played from Great Manual)

38	8'	Spitz Flute.....	wood	61	pipes
39	8'	Muted Viola.....	metal	61	"
40	8'	Flute Celeste.....	wood	49	"
41	4'	Wald Flute.....	wood and metal	61	"
42	8'	Vox Humana.....	reeds	61	"
43		Chimes.....		20	bells

PEDAL ORGAN

44	16'	Open Diapason.....	wood	44	pipes
45	16'	Bourdon.....	wood	44	"
46	16'	Violon.....	from No. 1	32	notes
47	16'	Lieblich Gedeckt.....	from No. 12	32	"
48	8'	Octave Bass.....	from No. 44	32	"
49	8'	Violoncello.....	from No. 33	32	"
50	8'	Dolce Flute.....	from No. 45	32	"
51	8'	Gedeckt.....	from No. 14	32	"
52	16'	Tuba.....	20 from No. 11	32	"

COUPLERS

53	Great to Pedal	65	Choir 4'
54	Swell to Pedal	66	Choir 16'
55	Choir to Pedal	67	Swell to Choir
56	Swell to Pedal 4'	68	Swell to Choir 4'
57	Great to Pedal 4'	69	Swell to Choir 16'
58	Swell to Great	70	Swell 4'
59	Swell to Great 4'	71	Swell 16'
60	Swell to Great 16'	72	Choir to Swell
61	Choir to Great	73	Swell Unison in Key Jamb
62	Choir to Great 4'	74	Choir Unison in Key Jamb
63	Choir to Great 16'	75	Echo "On," Great "Off"
64	Great 4'		

MECHANICALS

76	Swell Tremulant	78	Echo Tremulant
77	Choir Tremulant		Crescendo Indicator

ADJUSTABLE COMBINATIONS

(Operated by pistons placed under respective manuals, also by corresponding pedal pistons)

Piston No. 1	}	Affecting Swell Organ with duplicate Pedal Studs
Piston No. 2		
Piston No. 3		
Piston No. 4		
Piston No. 5		
Piston No. 1	}	Affecting Great and Echo Organs with duplicate Pedal Studs
Piston No. 2		
Piston No. 3		
Piston No. 4		
Piston No. 5		
Piston No. 1	}	Affecting Choir Organ
Piston No. 2		
Piston No. 3		
Piston No. 4		
Piston No. 1	}	Affecting Pedal Organs
Piston No. 2		
Piston No. 3		
Piston No. 4		
Piston No. 1	}	Affecting Full Organ
Piston No. 2		
Piston No. 3		

PEDAL MOVEMENTS

- 1 Great to Pedal Reversible
- 2 Balanced Swell Expression Pedal
- 3 Balanced Choir Expression Pedal
- 4 Balanced Echo Expression Pedal
- 5 Grand Crescendo Pedal

Organ Bench with Music Shelf of same material as Casing
Concave Pedal
Electric Blower of ample capacity

APPENDIX II

**Church Building Data to be Collected for use with
the Score Card for City Church and
Religious Education Plant**

Before the actual scoring is done for a church plant it is essential that complete information be secured of all facts which will influence the judgment of the scorers. In the following pages will be found blanks and forms which have been arranged for the purpose of assisting in the collection of such facts. These forms are used by the scorer while engaged in surveying the plant. They assist in giving a comprehensive idea of the completeness of any facility or equipment provided. Data collected on such forms for a number of church plants will permit of statistical tabulations which are found valuable in analyzing the entire situation with respect to one community.

The forms, it will be seen, follow the score card outline as given in Chapter II. They also include space for notation of other important facts, such as cost data, needed repairs and data concerning each room. Space is also provided for the sketching of floor plans where it is thought that such plans will assist scorers in their final report on any single situation.

Date..... Filled out by.....

Name of church Denomination.....

City..... County..... State.....

Attached to what other church or churches.....

	Original	First addition	Second addition	Third addition	Total
1. Cost of site.....	\$.....	\$.....	\$.....	\$.....	\$.....
2. Length of site.....	ft.	ft.	ft.	ft.	ft.
3. Width of site.....	ft.	ft.	ft.	ft.	ft.
4. Area of site.....	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.

	Original	First addition	Second addition	Third addition	Total
5. Cost of main building. \$.....	\$.....	\$.....	\$.....	\$.....	\$.....
6. Year of construction.....	.....	.....	.....	.....	.....
7. Length of main building.....ft.	ft.	ft.	ft.	ft.	ft.
8. Width of main building.....ft.	ft.	ft.	ft.	ft.	ft.
9. Area occupied by main building.....sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.
10. Chief material used.....	.....	.....	.....	.....	.....
11. Number of stories.....	.....	.....	.....	.....	.....
12. Cost of 2nd building. \$.....	\$.....	\$.....	\$.....	\$.....	\$.....
13. Year of construction.....	.....	.....	.....	.....	.....
14. Length of 2nd building.....ft.	ft.	ft.	ft.	ft.	ft.
15. Width of 2nd building.....ft.	ft.	ft.	ft.	ft.	ft.
16. Area occupied by 2nd building.....sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.
17. Chief material used.....	.....	.....	.....	.....	.....
18. Number of stories.....	.....	.....	.....	.....	.....
19. Cost of 3rd building. \$.....	\$.....	\$.....	\$.....	\$.....	\$.....
20. Year of construction.....	.....	.....	.....	.....	.....
21. Length of 3rd building.....ft.	ft.	ft.	ft.	ft.	ft.
22. Width of 3rd building.....ft.	ft.	ft.	ft.	ft.	ft.
23. Area occupied by 3rd building.....sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.
24. Chief material used.....	.....	.....	.....	.....	.....
25. Number of stories.....	.....	.....	.....	.....	.....

26. Area occupied by all buildings.....sq. ft. Cost of all bldgs., \$.....

27. Evaluation of entire plant (including site), \$.....

	Men	Women	Boys (18 or under)	Girls (18 or under)	Total
28. Church membership					
29. School enrolment to date.....					

30. Accessibility. Percentage of patrons residing within 1 mile radius.

From 1 to 2 mile radius. From 2 to 3 mile radius.

Above 3 miles from church

31. Is immediate environment attractive?.....Sanitary?.....

Remote from fire dangers?..... Quiet?..... Other in-
fluencing conditions?.....

32. Percentage of site used for:

Lawns and landscapes%

Buildings%

Recreation%

• Gardening.....%

Cemetery%

Horse sheds or auto parking space%

Dumps or unused section.....%

Total.....%

33. Name the kinds of playground apparatus and number of each.....

.....

.....

.....

.....

.....

.....

.....

EQUIPMENT AND SERVICE DATA FOR EACH BUILDING*

Name of building.....

1. Check the kind of heating system: wood stove; coal stove; gas stove; jacketed heater; hot air furnace; steam boiler; hot water boiler

Is it reported satisfactory?..... By whom?.....

List the rooms which cannot be satisfactorily heated.....

What are the causes of unsatisfactory heating?.....

Is thermostatic control provided?.....

Date of last official boiler inspection.....

2. Check the kind of ventilating system: natural circulation; window ventilators; gravity system without exhaust accelerators; gravity system with exhaust accelerators; mechanically furnished fresh air supply

Is the system reported satisfactory?..... By whom?.....

List the rooms not satisfactorily ventilated.....

Has a humidifer been installed?.....

3. List the rooms in which any of the following fire apparatus is found:

Fire extinguishers.....

Fire hose.....

Automatic sprinkler.....

What type of construction is building? (Use letter in key at bottom of page 53)

Basement isolated from first floor; basement ceiling fireproof or of fire resisting material; heating apparatus in fireproof enclosure; combustible and inflammable material stored in building

*If the church and school building plant consists of more than one building use one of these forms for each building.

Stairways	Location	Winding or straight	Number of turns	Height of riser	Width of tread	Handrails, none, single or double	Width of stairway	Material	Fireproof enclosure
To basement.....									
To basement.....									
To basement.....									
To 1st floor.....									
To 1st floor.....									
To 1st floor.....									
To 2nd floor.....									
To 2nd floor.....									
To 2nd floor.....									
To 3rd floor.....									
To 3rd floor.....									
To 3rd floor.....									

Maximum capacity of basement..... 1st floor.....

2nd floor..... 3rd floor.....

List all rooms which do not have two ways of egress.....

Has basement an outside exit?

List the important locations where doors open inward.....

Are outer doors equipped with panic bolts?.....

Are outside fire escapes provided?.....

Fire gongs?.....

Width of outer doors: (Indicate doors by letters on floor plans)

A.....; B.....; C.....; D.....; E.....

4. Is cleaning done by brooms or vacuum?.....

What evidences of efficient cleaning services prevail?.....

5. Check type of artificial lighting system used: oil lamps; gas.....; electricity.....

Is the lighting direct, indirect, or semi-indirect?.....

In what rooms is lighting reported unsatisfactory?.....

6. In what rooms is telephone connection provided?.....

7. Name locations of drinking fountains.....

Are these fountains sanitary?.....

List locations of toilets for men.....

for women.....

Are toilet paper and towels provided?.....

Is proper seclusion provided?.....

Do sanitary conditions prevail?.....

Are high-grade toilet fixtures installed?.....

Are washbowls provided?.....

Hot and cold water?.....

Are sinks provided in kitchen?..... in workroom?.....

Name any special provisions for bathing furnished.....

8. Are classrooms provided with blackboards?.....

pupils' desks?..... adequate maps?..... teacher's desk?.....

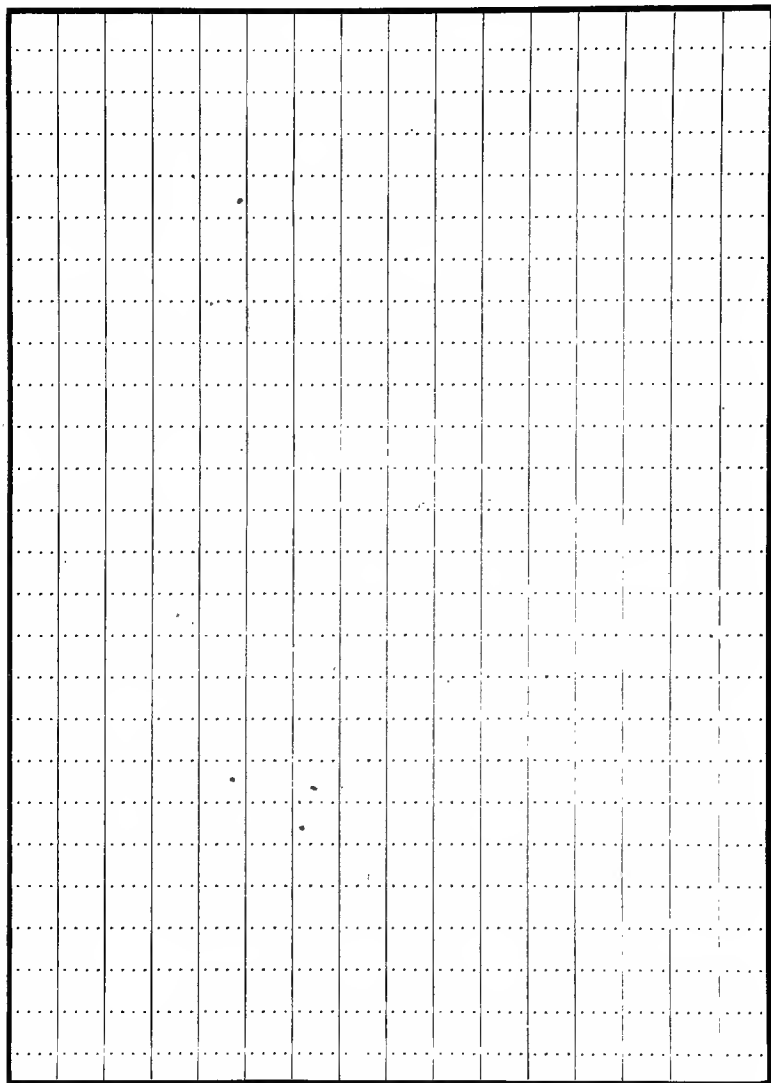
List other classroom equipment provided?.....

Draw floor plans of each building. Indicate scale in feet. Designate each floor and each room. Give dimensions wherever possible. Scale: . . . inch = . . . feet.

The form consists of a large rectangular grid. It is divided into 20 equal-width vertical columns by solid black lines. Each of these columns is further divided into 30 equal-height horizontal rows by dotted lines. This creates a total of 600 small squares (20 columns by 30 rows) for drawing floor plans.

Each side of square may represent 10 ft., 20 ft., etc., as designated above.

Draw floor plans of each building. Indicate scale in feet. Designate each floor and each room. Give dimensions wherever possible. Scale: . . . inch = . . . feet.



Each side of square may represent 10 ft., 20 ft., etc., as designated above.

DATA CONCERNING EACH ROOM

Where rooms are used for more than one purpose report it only once and according to its major use

[illegible]

AND RELIGIOUS EDUCATION PLANT 71

IV C	Chapel or small assembly	11
IV D	Parlor and church boardroom	12
IV E	Pastor's study	13
IV F	Church office	14
IV G	Church vault	15
V B	School assembly	16
V C1	Cradle roll classroom	17
V C1	Beginners' assembly	18
V C1	Beginners' classroom	19
V C1	Beginners classroom	20
V C1	Primary assembly	21
V C1	Primary classroom	22
V C1	Primary classroom	23
V C1	Primary classroom	24
V C1	Junior assembly	25
V C1	Junior classroom	26
V C1	Junior classroom	27
V C1	Junior classroom	28
V C1	Junior classroom	29
V C1	Junior classroom	30
V C1	Intermediate assembly	31
V C1	Intermediate classroom	32
V C1	Intermediate classroom	33
V C1	Intermediate classroom	34
V C1	Intermediate classroom	35
V C1	Intermediate classroom	36

Score card number	a. Number of room	b. Capacity (Persons accommodated)	c. Dimensions, length, feet	d. Dimensions, width, feet	e. Dimensions, height, feet	f. Floor area, square feet	g. Area per individual of capacity	h. Total cubical contents, cubic feet	i. Cu. ft. per individual of capacity	j. No. of windows at front	k. No. of windows on left	l. No. of windows at rear	m. No. of windows on right	n. Area of windows at front	o. Area of windows on left	p. Area of windows at rear	q. Area of windows on right	r. Total window glass area, sq. feet	s. Ratio of window area to floor area	t. No. of hours used during week	u. No. of people using during week previous to the survey	v. List any other uses made of the room and important facts concerning equipment	Line No.
V C1	Senior assembly.....																						37
V C1	Senior classroom.....																						38
V C1	Senior classroom.....																						39
V C1	Senior classroom.....																						40
V C1	Young people's assembly.....																						41
V C1	Young people's classroom.....																						42
V C1	Young people's classroom.....																						43
V C1	Young people's classroom.....																						44
V C1	Men's assembly.....																						45
V C1	Men's classroom.....																						46
V C1	Men's classroom.....																						47
V C1	Men's classroom.....																						48
V C1	Women's assembly.....																						49
V C1	Women's classroom.....																						50

Rooms are arranged in order as they appear on the score card.

(A maximum of rooms are listed in order to care for the largest city church and school plants).

V C1	Women's classroom.....	V C1	51
V C1	Women's classroom.....	V C1	52
V C1	Teacher training.....	V C1	53
V D	School cloakroom.....	V D	54
V D	School cloakroom.....	V D	55
V D	School cloakroom.....	V D	56
V D	School cloakroom.....	V D	57
V E	Superintendent's office.....	V E	58
V E	.....	V E	59
V F	Supply room.....	V F	60
V F	Supply room.....	V F	61
V F	Supply room.....	V F	62
VI A1	Recreation and dining.....	VI A1	63
VI A2	Kitchen.....	VI A2	64
VI A3	Library and reading room.....	VI A3	65
VI B1	Women's and mother's room.....	VI B1	66
VI B2	Girls' clubroom.....	VI B2	67
VI B2	Girls' clubroom.....	VI B2	68
VI B3	Men's clubroom.....	VI B3	69
VI B4	Boys' clubroom.....	VI B4	70
VI B4	Boy's clubroom.....	VI B4	71
VI B5	Nurses' and rest room.....	VI B5	72
VI B6	Day nursery room.....	VI B6	73
VI B7	Civic center.....	VI B7	74
VI B8	Social workers office.....	VI B8	75
VI C1	Gymnasium.....	VI C1	76

DATA CONCERNING EACH ROOM—Continued

Score card number	a. Number of room	b. Capacity (Persons accommodated)	c. Dimensions, length, feet	d. Dimensions, width, feet	e. Dimensions, height, feet	f. Floor area, square feet	g. Area per individual of capacity	h. Total cubical contents, cubic feet	i. Cu. ft. per individual of capacity	j. No. of windows at front	k. No. of windows on left	l. No. of windows at rear	m. No. of windows on right	n. Area of windows at front	o. Area of windows on left	p. Area of windows at rear	q. Area of windows on right	r. Total window glass area, sq. feet	s. Ratio of window area to floor area	t. No. of hours used during week	u. No. of people using during week pre- vious to the survey	v. List any other uses made of the room and important facts concerning equipment	Line No.
VI C2	Locker room.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	77
VI C2	Locker room.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78
VI C3	Showers.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	79
VI C3	Showers.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80
VI C4	Swimming pool.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	81
VI C5	Handball court.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	82
VI C6	Game and Amusement room.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	83
VI C7	Bowling alley.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	84
VI C8	Other rooms.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85
																							

Rooms are arranged in order as they appear on the score card.

(A maximum of rooms are listed in order to care for the largest city church and school plants).

Publications of the Interchurch World Movement of North America

Religious Education Survey Department

FOR USE IN MEASURING THE ADEQUACY OF
CHURCH AND RELIGIOUS EDUCATION PLANTS

1. Score Card for City Church Plants—to be used with the Interchurch World Movement Standards for Rating City Church Plants.
2. Score Card for Rural Church Plants—to be used with the Interchurch World Movement Standards for Rating Rural Church Plants.
3. Standards for City Church Plants—to be used with the Interchurch World Movement Score Card for City Church Plants.
4. Standards for Rural Church Plants—to be used with the Interchurch World Movement Score Card for Rural Church Plants.
5. Survey Manual for Church Plants—to be used with the Interchurch World Movement Score Card and Standards for Rating Church Plants.
6. Scorer's Field Book—for use in connection with the Interchurch World Movement Standards for Rating Church Plants.
7. The Malden Survey—a Report on the Church Plants of a Typical City, showing the use of the Interchurch World Movement Score Card and Standards for Rating City Church Plants.

